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INTERRELATIONS OF THE SENSORY SYSTEMS IN PERCEPTION

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It is a commonly observed fact that most objects of our everyday lives are perceived by means of two or more sensory modalities working in coöperation. One set of modal qualifications usually predominates (*e.g.* color), but in most cases other qualifications, which are not specific to any particular sensory avenue or which belong to some other sensory mode, fill out the total object, scene, or occasion. In fact, we may say that it is extremely rare outside of the controlled conditions of the laboratory that even a single object is the product of operation of a single sensory system.

The writer has set out to bring together in this paper a number of experimental observations which bear upon the interrelations of the various sense departments, with special emphasis upon coöperative function. Because of this special interest in coöperation, conditions which result in disruptive or inhibitory effects of one system upon another will receive scant attention.

The topic has many ramifications. In one direction it leads off into problems of attention, in another to synesthetic phenomena, in another to matters of work and energy expenditure. In all directions we seem to come eventually to general theories of perception. For these reasons we have attempted to restrict the scope of the summary and citations to a central core of concrete interrelations between sensory systems, keeping general theory of perception at a minimum. Other topics suggested by some of these facts, such as attention, synesthesia, distraction, and the like, have already been surveyed adequately in other places or must, because of their size and com-

plexity, be left to future reviewers. Occasionally, we shall find it necessary to refer to some of these summarizing sources.

Introduction

Writers of general discussions of perception refer occasionally to the problem of coöperation in perceiving, but rarely include a citation of experimental results. Stern (70) devotes a chapter to "The Interrelations of the Senses," as one might expect from his personalistic approach, but this discussion is largely theoretical. Bentley (3) notes that "it is the rule and not the exception that the various forms of stimulus and the various receptorial resources *coöperatively produce the object and the living scene*" (p. 169). Further: "The organism contributes at large from multiple resources in all these cases. The most that we can credit to the single sense is a point of emphasis or focus" (p. 170). A similar discussion is presented by Feldman and Weld (15, p. 412).

While this paper was in preparation Dashiell (9) made reference to our problem in his presidential address, mentioning some of the papers we shall discuss and concluding: "Shades of our predecessors with their air-tight sense modalities! They did, to be sure, recognize the synesthesias, colored-hearing, number forms, and the like. . . Such curiosa were, however, curiosa" (p. 2). Dashiell is, we fear, too optimistic concerning modern research on perception. Many of our predecessors did have "air-tight sense modalities," but so do many of our contemporaries. In assembling the material for this paper, the writer found quite as much factual material in papers written by "our predecessors" as he did in more modern papers.

Kinds of Relation Between Sensory Systems

In addition to coöperation there are a number of other interrelations between sensory systems which have received experimental attention. In fact, these other kinds of interrelation have received more actual investigation than coöperative function. Although we are directing this discussion primarily toward the latter phase, we must examine all of these directions of investigation in order to find what significance they have for perception.

We have sorted the experiments to be considered roughly under four major headings. In some cases it has been necessary to make further subdivisions as indicated in the following table.

TABLE I

(A) Dynamogenic Intersensory Effects

(B) Intersensory Dependence and Consonance
  (a) Similarity of qualifications across modalities
  (b) Changes in quality due to heteromodal stimulation

(C) Intermodal Relations in Perceiving Spatial Qualifications
  (a) Changes in localization due to heteromodal stimulation
  (b) Coöperation of modalities in production of spatial qualifications
  (c) Reorganization of spatial properties under influence of reversed or distorted cues

(D) Intermodal Relations in Perceiving Other Nonspecific Properties of Objects

Distinctions between these headings will become more clear as we consider the concrete facts and methods involved, but a preliminary characterization of some of the less obvious designations might be useful here. 'Dynamogenic' (A) is a term borrowed from Johnson (37) and used to designate instances where stimulation of one modality increases sensitivity or acuity in another. Intersensory dependence (B) involves an influence upon the *qualities* of another modality, not a mere change in the limits of perceptive performance.

Under the headings (A) and (B) we limit the consideration to intermodal influences upon *specific* qualities, that is, qualifications of objects which are produced by only one sensory system. Some would call them 'sensations,' but we do not wish to become involved in the philosophical and theoretical problems involved in the distinction between the traditional meanings of 'perception' and 'sensation.' Under headings (C) and (D) we turn to more general properties of perceived objects, properties which belong to no specific modality. Here we may expect to find most of our material upon coöperative function. Even in connection with such nonspecific properties, however, coöperation does not come into its own in the experimental literature, but is buried under a mass of other problems. Perhaps the following brief section will explain this state of affairs.

Neutral vs. *Meaningful Interrelations*

As we go through the investigations to be summarized in this paper we shall find again and again that true coöperative function is missed or deliberately avoided in the experimental arrangements or in interpretation of results. The reason for this is to be found in a kind of approach which, curiously enough, is common to *Gestalt*

investigations and to many 'sensory' studies. This approach, or direction of emphasis, is quite distinct from the controversy over analysis *vs.* totality, although it may have implications for that problem as well.

The configurational 'laws' to be found in *Gestalt* textbooks and articles are said to be independent of any meaning or significance in the perceived pattern. In fact, they must be demonstrated with relatively neutral or meaningless patterns such as dots and geometrical figures. As soon as we begin to deal with the objects of everyday life or with special instructions for the observer, other factors are said to cut across these 'laws.'

In similar fashion, traditional investigations of perceptual problems have studied the localization of 'mere sounds' without much objective significance, the visual movement of dots and lines taken in isolation, and so on through many more examples. Where meaning or significance has been met with it is thrown off as associative and thus brought under mechanical 'laws' of repetition, contiguity, and the like.

When we turn to the interrelations of the senses we find a similar approach. The effect of an auditory stimulus upon visual quality or spatial arrangement is also considered from this neutral point of view. That is, objective significance, the apprehension of causal relationships in the perceptual field, knowledge of the total situation, and 'meaning' in general are kept at a minimum.

The result is that in these artificial situations one sensory system does not *coöperate* with another in perceiving a total, meaningful situation as it does in everyday life, but sensory systems simply *affect* one another in much the same way in which a thunderstorm affects radio reception.

The fact is that we do not spend our lives perceiving dots, lines, squares, and colors in a vacuum, but rather we perceive men, tables, chairs set in situations which are more than mere geometrical patterns. They are set in dynamic situations, affecting one another socially and physically, and this total situation is all perceived. Until this larger scope of perceiving is taken into account we cannot expect coöperative function of the sensory systems to receive its due.

It is true that many of these investigations of 'neutral relations' use the term 'dynamics.' But this is a dynamics which is still 'neutral' in the sense in which we have used the term. That is, it is a dynamics which is left after we abstract sensory function from the total perceptive performance of turning out significant scenes and

occasions. Color is still considered *per se* rather than as an attribute of an object, and even movement is abstracted from the moving object.

Experimental Findings

(A) *Dynamogenic Effects*

Here we consider experiments where the limits of perceptive function are involved. That is, outside or auxiliary excitation is considered for its effects upon sensory thresholds and accuracy or fineness of discrimination. We present first a brief summary of the experimental findings and then go on to consider in a cursory manner some of the interpretations which have been placed upon these facts.

The first name to be mentioned here, and also under several other of our headings, is that of Urbantschitsch. He performed a wide range of exploratory experiments (77, 78) upon intersensory relations. Unfortunately, the voluminous results which he reports are not matched by any clear statement of conditions or instructions, or of the reliability of his results. He has undertaken the study of so many different relationships that it seems almost impossible that the individual experiments were repeated enough times to be reliable. Also, it is not evident that suggestion from the experimenter was ruled out as a factor determining his findings.

Urbantschitsch proceeded through all of the sensory modes, noting effects of each upon each of the others. For example, he finds (under dynamogenic effects) that auditory stimulation with a tuning fork increases color sensitivity (77, p. 156); that binaural stimulation has a greater effect than monaural stimuli; that high tones are more effective than low tones; that different colors are influenced differently by different pitches; and so on through a long list of similar variations for each combination of sensory modes.

In view of what we have said concerning Urbantschitsch's reports, it would be best to regard his work as primarily suggestive and pass over it to more modern studies where more information concerning conditions and reliability are given.

Johnson (37) has studied the effect of changes of illumination of a uniform visual field upon tactual discrimination in card-sorting. The discrimination was purely tactual, since *S* wore ground-glass goggles throughout the experiments. Out of 16 *S*'s, six showed reliably better discrimination when the visual field was bright, seven showed *un*reliable differences in favor of the bright field, and only one of the 16 was reliably more accurate when the field was dark.

Effects on Visual Acuity. The experiments of Kravkov and of Hartmann upon the effects of heteromodal stimuli upon visual acuity both had their origin in experiments upon the interrelations of the two eyes. Kravkov (**45, 47, 48**) had found that the acuity of one eye was changed by diffuse general illumination of the other eye. Acuity was *increased* when the test objects were black upon a white background and *decreased* when the objects were white upon a black background. In contradiction to these findings, Hartmann (**29**) reports experiments in which acuity was increased by illuminating the unused eye, *no matter what kind of test object was used.*

Similar contradictions were found when each of these men extended their experiments to study the effect of nonvisual stimuli upon visual acuity. They have used auditory, olfactory, and tactual auxiliary stimuli (**30, 46, 47**). Again Kravkov reports that the direction of the effect depends upon the nature of the test objects, and again Hartmann reports that the auxiliary stimulus increases acuity independently of the nature of the test objects.

More recently, Kravkov (**49**) has reported that acoustic stimulation affects color thresholds as well as acuity of vision. Acoustic excitation is found to increase sensitivity for short wave-lengths and to decrease it for long waves over 520 mμ. Similar acoustic stimuli decrease the light sensitivity of the rod apparatus. Serrat and Karwoski (**69**), however, failed to find any significant effect of sound upon light threshold at 506 mμ or on hue threshold at 710 mμ.

The similarity between the effect of illuminating one eye upon the sensitivity of the other and the effect of heteromodal stimuli upon the same visual limits would indicate that the mechanism is not specifically visual, whatever it may be. Thus, under some circumstances at least, the two eyes can be considered as though they were separate sensory systems, one eye affecting the other in the same manner that auditory excitation affects vision.

We cannot, of course, go into the enormous literature upon binocular relations here, especially since the two eyes function as a single system for the most part. We should mention, however, one set of results which may have some bearing upon Kravkov's and Hartmann's researches upon binocular relations. In several early researches (cf. summary by Titchener, **76**) it was found that stimulation of one eye could result in after-images in the other eye and also simultaneous contrast in the other eye. Carr (**6**, p. 72) claims that these after-images were projections of the after-image in the stimulated eye and simply another example of binocular fusion.

These investigators were not quite so naïve as Carr would have us believe. The induced after-effect was identified in some experiments by keeping the lines of sight parallel and observing the nonoverlapping portions of the visual field (Titchener, 76, p. 295), or indirect evidence was produced (Ebbinghaus, 12).

These phenomena might have some bearing upon the explanation of Kravkov's and Hartmann's interocular effects (once we find the key to the contradiction of results). The difficulty is, however, that any attempted coördination of these varied facts would probably be couched in terms peculiar to the visual system, and this would not aid in understanding the effects of nonvisual stimuli upon visual limits.

Theories of Acuity-Change. Kravkov (48) has offered a general explanation of these phenomena, which hinges upon his observation that auxiliary stimuli affect acuity in different manners for different brightness relations of the test objects. According to his theory, acuity is dependent upon the amount of irradiation of bright surfaces. Increasing irradiation for white objects on black *decreases* acuity, while increasing irradiation for black objects on white *increases* acuity (since it tends to widen the gap to be perceived). Amount of irradiation, in turn, is affected by the absolute light-thresholds. The effect of auxiliary stimulation is to set up 'subliminal excitation' (p. 806) in the system whose acuity is being tested. This subliminal excitation lowers the absolute limens for brightness, thus increasing the amount of irradiation. The differential effect for different kinds of test object is thus a necessary requirement for the acceptance of Kravkov's theory.

Since Hartmann's intersensory effects are much less specific, his theory is naturally more general in character. He merely speaks of a facilitative or tonic effect which spreads to other systems. Johnson's experiments also fit into such a concept. Certainly Johnson's results involve a tactual discrimination which is too complex to be explained in terms of a simple lowering of the threshold as a result of an overflow of excitation, as Kravkov's theory would require. The notion of a general tonic effect is, however, so vague as to be of little help in understanding these facts. It is little more than a statement of the actual experimental results in terms which carry a physiological flavor.

As for the contradictory evidence presented by Kravkov and Hartmann, both sides have weighty evidence. Gotoh (28) has repeated Kravkov's work and substantiated it, and Kravkov reports

that another student has also repeated the work. Honzik (33) has checked over Hartmann's figures, applying the standard formulae for reliability and finding that most of the differences reported were reliable. Some unnoticed experimental difference must, therefore, account for the difference in result. Kravkov believes that Hartmann did not make sufficient allowance for the fact that the effects of auxiliary stimuli last over for an interval of several minutes. In alternating between the control and experimental conditions, Hartmann (according to Kravkov) was actually securing *all* of his results under conditions of auxiliary excitation. If Hartmann had obtained no reliable effects at all, this argument might account for it, but it does not explain the reliable differences which he did find.

Influences of Light Upon Other Modalities. So much for the effects of outside stimuli upon vision. A few studies have also considered other intersensory combinations. Hartmann (31) and Child and Wendt (7) determined the effect of visual stimuli upon auditory sensitivity. Hartmann found that bright general illumination increased (by 3%) scores for the Seashore records for pitch and intensity discrimination, as compared with a 'dark' condition with a dim light for recording judgments. This result held for the group of *S*'s as a whole and for the majority of individuals. When *S* reported in complete darkness, however, the results were *un*reliably in favor of the *dark* condition. Child and Wendt (7) studied particularly the effect of the temporal interval between a flash of light and a sound, determining the auditory thresholds. The effect of the light was greatest when it occurred from 0 to .5 or 1.0 second before the sound.

Freund and Hofmann (19) had found earlier that light improved the auditory acuity of the deaf, although their results were considered as due to 'irradiation' and shifts in attention as well as to intersensory effects proper. Freund (18) also found facilitation of olfactory perception as the result of illumination.

It will be noted that we have said nothing concerning inhibitory effects of auxiliary stimuli. It may be that such effects are merely different aspects of the same mechanisms involved in facilitative phenomena like those we have described. On the other hand, it is quite as likely that such inhibitory effects are, for the most part, disruptive and distracting in character and thus do not involve any high degree of specific integration between sensory modes. Jacobson (36) interprets 'Heyman's Law' of inhibition in this vein, and, for brevity's sake, we shall leave the problem at that point.

So much for a catalogue of the outstanding facts and theories of dynamogenic intersensory relations.[1] They leave little doubt that there is a dynamic interplay between sensory systems of the organism, although the exact nature of the influence of one modality upon another is by no means clear. Whatever theories are eventually devised to account for the facts, the important thing at present is to recognize that such dynamic interplay between sensory systems is possible.

On the other hand, we must note that we are dealing here with what we called previously 'neutral' interrelations. The effects are measured upon highly abstract and simplified perceptive functions, and no account is taken of perceiving as a process which deals with objects and events. Also, even if we restrict the consideration to such a neutral approach, we must note that these dynamogenic effects are always slight and that they can be detected under only highly specialized conditions. There is, after all, some justification for those who tend to regard the sensory systems as more or less isolated from one another.

(B) *Intersensory Dependence and Consonance*

Under certain conditions it can be shown that qualities perceived by one sensory system are influenced by stimuli reaching other sense organs. In the preceding section we noted that auxiliary stimuli may change the thresholds of stimulation of other sense organs. Here we deal with actual changes in quality as a result of such auxiliary stimuli, and these changes we refer to as intersensory *dependence.* Most investigations of this kind find a regularity in this dependence. In other words, the influence of an auditory stimulus upon perceived color is not random, but there are definite relations between certain properties of the auditory stimulus (or of the heard sound) and certain properties of the visual qualities. The changes, therefore, are not only dependent upon the auxiliary stimulus, but *consonant with* properties of that stimulus.

Intermodal Properties. Of great importance to the study of consonance is the question of what aspects of sensory (*specific*) qualities are comparable from one modality to another. The aspect

[1] After writing this paper the author has learned of another discussion of this topic now in press in the *J. gen. Psychol.* (Gilbert, G. M. Inter-sensory facilitation and inhibition.) It was necessary, in the present discussion, to give a very brief survey of this topic and to subordinate it to our more general program. The reader may therefore find further useful information in Gilbert's summary which, unfortunately, the present writer has not seen.

which has received greatest attention from this point of view is that of *brightness*. Intensity, which is commonly accepted as comparable across most modalities, seems not to have played such a large part in investigations of consonance. Intensity does, of course, become difficult when vision is under consideration. Werner (**83**) seems to imply that intensity in other modes is related to saturation in color.

Let us restrict the consideration of comparable aspects of quality to brightness, since this has received concrete investigation by Von Hornbostel (**35**). He found it possible to equate brightness among colors, sounds, and odors, with great stability on the part of *O*. Juhasz had earlier found this possible for sounds and odors (**38**, **39**), although he referred to the property as 'pitch.' Von Hornbostel's procedure was to match (1) a color (gray) to a particular odor, (2) a sound to the same odor, and finally (3) a color to the sound determined in (2). Thus, a color was matched with respect to brightness directly to the odor and also indirectly through the intermediate step of sound to the odor. The colors determined in the two ways matched fairly closely. Von Hornbostel believes that this result makes possible a more exact study of odors, since odors in isolation are so difficult to describe. It is now possible to arrange odors in order of brightness in a very stable manner, and as a result of these determinations Von Hornbostel proposes a theory of the chemical correlate of olfactory brightness (pp. 520 ff.).

It is unfortunate that such a neat result has not been corroborated by later studies. Cohen (**8**) repeated the procedure of triangular matches of colors, odors, and sounds with two *O*'s. He found little agreement between the tones matched directly to odors and the tones matched indirectly through colors (grays). In fact, the tones were more than an octave apart. Cohen believes that the process of comparison of brightness across modalities is not direct, but involves a conceptual placing of each quality upon a separate schematic continuum of brightness, making use of two distinct absolute scales. These scales shifted during the week between observations. Such absolute scales are determined by events between observations and also by the series of values used in the experiment. It is therefore possible that Von Hornbostel predetermined the stability of his results by his choice of stimulus values.

Possibly Cohen's two observers were exceptional. Von Hornbostel does not state how many observers he used, but he does say that he used a large number. Also, Cohen's argument concerning shifts in absolute scales or standards would apply just as well to comparisons

within a single sensory mode as it does to intersensory comparisons. Yet, even if it were so applied, it would not eliminate brightness as a common property of colors.

The question of the stability of the relation between brightnesses in separate modalities does not seem to be crucial to the notion of brightness as comparable across modalities. It is conceivable that stable comparisons be made on the basis of mere external or conventional analogy, and it is also conceivable that instable comparisons be made even though brightness is directly comparable.

Von Schiller (**65**) has performed preliminary experiments in which it was found that fishes trained to a 'choice' of one of a pair of visual brightnesses tend to choose consistently one of a pair of odors which is presented later in place of the visual pair. Control experiments show that the fishes do not make such 'choices' without the previous visual training series. Such results, if substantiated, would indicate that olfactory brightness and visual brightness involve more than a mere *verbal* analogy.

All this, however, is by way of background for our central concern, which is that of intersensory consonance and dependence.

Dependence and Consonance. Again we shall pass rapidly over the studies of Urbantschitsch, although the value of his work as preliminary exploration must not be minimized. He concludes that "each tone can produce changes in visual sensations in accordance with its pitch, and often also in accordance with its intensity. The right ear can exhibit different effects from the left" (**78**, p. 441).

The experiments of Werner and his associates carry further some of Urbantschitsch's results under better defined conditions. Zietz (**88**) investigated systematically the interrelation between the visual and auditory systems. It was found that color quality was influenced by auditory stimuli only when the color was instable, filmy, and low in saturation. For this purpose, Zietz used after-images, brief tachistoscopic exposures, color-wheel mixtures of low saturation, and the like. The auxiliary stimulus must be indefinitely localized and space-filling. Under these conditions it was found that low tones tend to make a color darker, warmer, 'unclear,' and 'dirty.' With high tones, color usually became brighter, colder, sharply contoured, and more solid or surfacy. Hue was also affected. Low tones shifted colors toward the red, blue, or violet, while high tones changed them toward green or yellow. Some effect of the auxiliary stimulus was found in 194 out of 250 experiments under Zietz's conditions.

Von Schiller and Wolff (67) carried out similar experiments with continuously changing characteristics of the auxiliary stimulus. With surface colors no uniform change occurred, but with film colors the brightness changed in consonance with changes in tonal brightness. To be effective, the tone had to be of high intensity, difficult to localize, and not too markedly different from the brightness of the color. The same authors also describe experiments upon the reverse effect of colors upon tones. Lability of the tones was secured by use of low intensities and by subliminal changes in frequency in a direction opposite to the brightness changes of the visual quality. The tone was sharply localized, while the color filled the whole optical field. They found that a marked change in visual brightness changed the tonal brightness in the same direction.

Von Schiller (63) found in similar fashion that auxiliary stimuli exert an influence upon fusion frequency and flicker in vision. Dissonant tonal combinations, beats, and noises tend to increase the amount of flicker and to produce it where it had not appeared before. Smooth combinations, such as fifths and identities, tended to make the visual appearance smoother. Tactile stimuli also influence flicker in consonance with their own smoothness or roughness.

Von Schiller believes that he is dealing here with a common intersensory property of roughness, just as in the preceding experiments he regarded the intersensory consonance of visual and auditory brightness as evidence that brightness is a single property common to the two modalities. In a later investigation (64) he extended the experiments on roughness to determine reciprocal effects of (1) optical stimuli upon auditory perception, (2) optical upon tactile perception, and (3) auditory upon tactile perception. In each case the results were similar to those already described.

Theories of Consonance. Werner's theoretical explanation of these results of his associates is in terms of two modes, or levels, of apprehension (82). (Actually he speaks of four such modes, but for our purposes we can simplify matters by considering the two most widely divergent modes.) One of these he calls 'sensing' and the other, 'perceiving.' In perceiving, objects are perceived as 'out there,' while in sensing, qualities are somehow apprehended as *inside* the organism, as generalized bodily feelings. Differences between modalities are largely obliterated, and the stimulus affects the organism as a whole. Colors, tones, odors, and so on, are all 'felt' rather than 'seen,' 'heard,' and 'smelled.'

This distinction fits into the experimental conditions under which

intersensory dependence is demonstrated. The quality to be influenced had to be clearly localized out in space and rather small, but at the same time labile with respect to the quality to be affected. The quality must be an instable *perception* in Werner's terminology. The auxiliary stimulus must conversely be indefinitely localized, diffuse and intense. It must, in other words, be such that *O* tends to *sense* rather than perceive it. This is further ensured by special instructions to *O*. Zietz, for example, instructed his *O*'s not to hear the auxiliary sound as a mere incidental or disturbing noise, but rather to regard it as belonging essentially to the situation, to 'take it within himself' (**88**, p. 268). He is to try to hear the tone in relation to the color impression and to "hear it in the color to a certain extent."

According to Werner's theory, therefore, intersensory dependence and consonance occur because the auxiliary stimulus is affecting the organism as a whole rather than a single sensory system. Similarly, phenomena of synesthesia occur because certain individuals readily assume this primitive attitude of *sensing*.

Many will question Werner's theory, and perhaps his results as well, because of the high degree of suggestion given to *O* in the experimental instructions. It would be best to conclude, therefore, that Werner's results indicate a special kind of perceiving which can be obtained under special instructions and which allows the formation of intersensory relations on the basis of common properties. Whether this mode of perceiving is at all common, whether it is really a 'primitive' form of apprehending, as Werner claims, is not demonstrated. The results of Werner's studies should be checked, with special emphasis placed upon the rôle of instruction and suggestion in the results.

Further Intermodal Properties. A few scattered studies of other intersensory properties have been reported. Mogensen and English (**52**) attempted to find out whether the apparent warmth of colors would influence the tactually perceived warmth of the same objects. Their *O*'s were told of the purpose of the experiment. Reliable differences were found between green and blue objects, on one side, and purple objects, on the other, purple objects being perceived (tactually) as cooler. Red, orange, and yellow fell between the two extremes. The authors were surprised at this result, which makes green and blue the 'warmest' colors. Metzger (**51**), however, points out that these judgments may involve *contrast* rather than *assimilation* of tactual to visual quality. Instead of judging the

warm colors as tactually warmer, those objects with warm colors tended to feel *cooler* by contrast to the visual appearance.

A common property of 'thickness' is attributed to tones and film colors by Moul (55). *O*'s were able to make comparisons between the density or voluminousness of a tone and the 'thickness' of a film color. Moul regards this characteristic as a 'prespatial' property of tones and colors.

Similarly, *weight* has been considered as a property of colors *per se*, quite apart from the objects which the colors modify. We shall leave a discussion of this problem, however, until we come later to consider the coöperation of sensory systems in the perception of weight in general. It can be treated more sensibly there.

Summary of Dynamogenic Relations and Intersensory Dependence. Those who, like Von Hornbostel, are caught up in the enthusiasm of demonstrating intersensory relations of these kinds, tend to regard the results described above as demonstrating the 'unity of the senses.' The sensory systems are regarded by Werner (83) and Von Hornbostel (34) as united in early development into a single, dynamic whole.

If we look at the facts with more detachment, however, we must recognize that they do little more than show that under very special conditions one sensory system can influence the specific qualities or limits of function of another sensory system. This may be of importance in understanding synesthesia or certain other special problems of perception, and it may possibly indicate something of the neural interconnections between these systems. Beyond that it does not go. It certainly does not provide any mechanism for the coöperative function of the various modes of everyday perception of objects and events. In fact, objects and events must be left out of the picture in studying intersensory dependence.

Von Schiller (64) speaks of the heteromodal pairs of quality as forming a unity or gestalt, and Hartmann (32, p. 145) regards the relation as that of figure and ground. Indeed, the conditions we have described are such as to make the quality to be influenced figural and the auxiliary quality of the nature of background. But the concepts of gestalt and of figure-ground are, as they appear in many researches (p. 662), "neutral" in character, since they refer to bare pattern rather than to objects of a meaningful kind.

Again we must emphasize that our aim is to show not only the positive contribution involved but also the problems of perceiving which are left out of account. It is our conclusion that the 'unity

of the senses' is much more evident when we study the perception of *objects* rather than bare neutral patterns of quality.

(C) *Intermodal Relations in Perceiving Spatial Qualifications*

We have divided the facts which fall under this heading into three main groups (see Table I, p. 661). Of these three groups the first is still concerned with 'neutral' relationships of the kind already described, although spatial properties are now involved. In the second two subdivisions we come to investigations of truly meaningful intersensory coöperation.

(a) *Changes in Localization Due to Heteromodal Stimuli.* We collect here all experiments in which localization *within a single sense department* is influenced by stimulation of other sense organs. It is intersensory dependence and consonance again, this time with regard to spatial properties.

Again we must go back to Urbantschitsch (78). Among his various observations was the fact that apparent movement of the radii of Burchardt's visual test-chart was enhanced or otherwise changed by auditory stimuli. Different pitches had different effects. Tactual and other stimuli were also found to affect the visual movement. The movements and character of after-images were also influenced by auxiliary stimuli.

An extensive investigation of localization under various auxiliary stimuli was presented by Klemm (42) in 1909. A major drawback to these results is that Klemm used only one or two *O*'s for each experiment, although large numbers of observations were made on these individuals. Many of the experiments should be repeated in order to check the applicability of these results to large groups.

The main techniques which Klemm used were as follows: (a) determination of the constant errors in placing a sound source in the median plane when a spark of light is presented simultaneously at one side; (b) comparison of localization of a sound with and without simultaneous presentation of a near-by light stimulus, and similar comparisons for combinations of sound and touch, etc.; (c) comparison of extents bounded by disparate stimuli (*e.g.* a light and a sound), with the stimuli appearing either simultaneously or in succession; (d) determination of limens for separation of two disparate stimuli and comparison with similar limens for monomodal stimuli. Here, also, stimuli were presented both simultaneously and successively.

The general result of all of these procedures is that two isolated

heteromodal stimuli presented fairly close together in a darkened room tend to be pulled closer together. For example, localization of a sound which is presented along with a light spark 4 cm. from the sound source shows a constant error in the direction of the light of about .9 cm. Reversing the situation results in an error of localization of the light, but of smaller size (.4 cm.). Combining tactual and auditory stimuli in the same way results in a greater constant error for the tactual localization than that for the auditory localization. Also, an auxiliary light stimulus affects touch localization more than an auxiliary sound does. In other words, light is the most stable spatially and exerts the greatest spatial 'inductive-effect.' Auditory stimuli come next in stability and in 'inductive' power.

Parallel results are found with the other experimental techniques. Here temporal relations of the stimuli must also be taken into account. Of two successively bounded extents marked off with a light flash at one end and a click at the other, the extent in which the light comes *first* will be judged as shorter than that in which light comes second. In other words, the inductive effect works forward in time and is greater for light on sound than it is for sound on light.

Similarly, a sound and a light must be farther apart, to be judged spatially separate, than either a pair of sounds or a pair of lights. The limen is greater when a light precedes or is simultaneous with the sound than it is when the sound precedes, since the inductive effect of light is greater. In other words, all three methods so far discussed bear out the conclusion that disparate stimuli tend to be pulled together, and that the order of inductive 'power' and of stability in space is (1) vision, (2) audition, and (3) touch.

The results of the first method mentioned fit into the same generalization. It was found that a light flash at the *left* side made it necessary to move the sound farther to the *right* before it appeared to be in the median plane. If we state this result in another manner it will be seen to fit into the other results. The light at the left tends to pull the sound toward the left, so that it no longer appears to be in the center. It must therefore be moved past the center so that the spatial induction will move it just to the median plane.

One other supplementary experiment is worth mentioning. Klemm attempted to find out whether spatial induction was modifiable by repetition. Two liminally separated disparate stimuli were repeatedly presented, while *O* was told that the separation was gradually changing. *O* was to stop *E* as soon as he perceived a change. If repetition tends to increase the tendency for spatial

induction, we should expect the relative number of reports of 'nearer' to increase as the experiment is repeated. Instead of comparing the early and late reports in the whole experiment, however, Klemm merely counted up the relative numbers of 'near' and 'far' reports *of the whole series*. For the pair light and sound, the ratio of 'near' reports to 'far' reports was 1.66. Klemm concludes from this that repetition strengthens the inductive tendency (pp. 117–118).

What Klemm apparently means by the effect of repetition is not a change in time, but a cumulative effect or a kind of temporal summation. The notion is that a small number of immediately successive stimulations are more likely to lead to a report of 'nearer' than they are to a report of 'farther.' It is the short-term effect of repetition which Klemm has demonstrated. It would have been of great interest if he had also considered the long-term or 'practice' effects of such repetition as well.

Allers and Schmiedek (2) have demonstrated similar spatial induction upon auditory localization as a result of visual after-images and imagined objects. An after-image was produced at one side of the median plane, and while it was visible a sound was presented. There were frequent errors of localization of the sound in the direction *toward* the after-image, but never in the opposite direction. *O*'s sometimes even confused quadrants, an error which does not normally occur. Allers and Schmiedek used *O*'s who were proficient at imagining clearly localized objects. When these *O*'s imagined such an object during the process of localizing a sound, the results were similar to those produced by the after-images.

Allers and Schmiedek conclude that localization can be influenced by 'psychological' as well as by physiological factors. Why the presence of an outside stimulus makes one set of neural events 'physiological' and the absence of a present outside stimulus makes another set of similar neural events 'psychological' is difficult to grasp.

Bodily Position and Localization. Another auxiliary factor influencing localization is reported by Goldstein (24, 25) for patients with neural lesions and by Goldstein and Rosenthal-Veit (27) for normal observers. Goldstein studied several individuals with cerebellar and cortical lesions which resulted in disturbances of muscular tonus and posture. A number of different kinds of observation were made, but because of the great similarity among the results we can be content with a few illustrations. As a result of the cerebellar or cortical lesions there was a general disturbance such that all sounds on the

disturbed side were localized too far over to that side. (This was not a motor difficulty in pointing, since it held when the normal arm was used.) By using tubes of differing lengths it was found that such patients localized sounds coming through tubes of equal length toward the disturbed side.

These patients were unable to hold their arms continuously straight to the front if the eyes were closed. The arm on the injured side tended to move gradually outward. Along with this change of position of the arm, there was a shift in localization of sounds, such that the tone tended to move outward along with the arm, returning to its original median position as soon as the arm was lowered. Similar effects are found in touch and in vision.

One of the most interesting interrelations found in this study holds also for the normal individual (27). If *O* is instructed to roll his eyes to one side—say, to the *left*—it is found that he tends to localize sounds further to the *right* than usual. This does not hold, however, under a slight change in instruction. If, instead of telling *O* to 'roll his eyes' to the side (with the lids closed), he is told to *fixate* an object at the side, the tone tends now to move in the same direction as the eyes. Kiss (41), Fischer (16), and Goldstein and Riese (26) had already shown that eye-movements affected the position of the arm in pointing 'straight ahead,' and that it made a difference whether the eyes were opened or closed. Goldstein believes that it is a difference in *set* which causes the reversal of the effect; it is not simply a matter of whether the eyes are open or closed. 'Looking to the side' is quite a different performance from 'pure eye-movement' and has opposite effects upon localization.

Goldstein (24, 25) draws the general conclusion that all of these facts and interrelations are the result of a basic physiological 'set,' a tendency to turn toward the object to be perceived *(Zuwendungstendenz)*. The only difference between the normal and abnormal observers, he believes, is that this tendency is increased as a result of lesions affecting the postural systems.

Certainly, such facts require a conception of a more complex order than that of 'induction' or attraction between stimuli. They require us to consider the total bodily involvement and the total orientation of the perceived body in space. The interrelations reported here all involve some kind of disturbance of orientation of the perceived body, a framework of perception which is basic to all localizing activity.

In these studies we approach a more truly coöperative intersensory relationship. Orientation of our perceived bodies in space

involves a complicated interrelation of many postural systems and of all of the directionally qualified senses. It is a truly dynamic interrelation in the sense that disturbance of any member of the whole tends to reorganize the total orientation and to result in 'illusions' of direction.

Unfortunately, all of these results require further checking. No statement of reliability is given, and the methods used were more like common clinical tests than the repeated observations of experiment. Until they are repeated we must take these observations merely as challenging suggestions.

Movement and Auditory Rhythms. In addition to studies upon purely spatial properties of objects, we have two papers which deal with the perception of moving objects as affected by auditory stimuli. Zietz and Werner (**89**) found that auditory stimulus patterns could produce a perception of movement where no movement had previously appeared. They used pairs of dissimilar objects presented tachistoscopically. Because of the dissimilarity, most *O*'s rarely saw any movement without the auxiliary sounds accompanying the presentation. Regular and consonant rhythms increased the number of reports of movement, while irregular rhythms reduced the sensitivity to movement, or made the movement irregular and 'wobbly.'

Maass (**50**) studied the effect of auditory rhythms upon ordinary 'optimal' movement in the tachistoscope, using figures made up of dots in such a way that a number of different patterns of movement could be perceived with the same figure. In other words, the figures were *ambiguous* as regards the direction of movement to be perceived. Auditory rhythms here tended to make the conditions less ambiguous, so that fewer kinds of movement were perceived when the rhythmic patterns were added. The auditory patterns also influenced the speed and duration of different phases of the perceived event.

In conclusion, we find in none of these studies of spatial 'induction' anything like a coöperative production of an object by several sensory modes. In one instance (Goldstein) we have a suggestion of the dependence of localization upon a basic framework of orientation which is itself dependent in a complex way upon the total motor and sensory systems. In all of the other studies, however, we find exactly the same 'neutral' approach which we found in the earlier sections upon intersensory dependence and dynamogenic effects. In other words, the change in localization which is considered takes place *within a single sense department.* To take Klemm's work as an example, the different sensory systems are still isolated from one

another and never become integrated into a single working unit. A few incidental exceptions to this rule will be taken up in the following section.

(b) *Coöperation of Sensory Systems in the Production of Spatial Qualifications.* We cannot take as evidence of coöperative function in perceiving an object the presence or absence of qualities belonging to the modalities in question. Coöperation of two sensory systems may or may not result in an object with two kinds of quality. In some cases one system simply modifies properties within some other modality. For example, kinesthetic excitations in the ocular muscles are correlated with *visual* spatial properties of the perceived object.

We shall not discuss the kinesthetic coöperation with vision because these facts are already well known to students of perception. Then, too, the integration of ocular muscle mechanisms with vision is so intimate that we can almost regard them as a part of a single sensory system. The two parts, kinesthetic-motor and visual, are so intimately bound up that it is difficult to separate them for experimental study. We therefore pass on to search for evidence of other integrations among the sensory systems.

Object vs. *Qualitative Pattern.* One fact must be faced at the outset. If we are to understand sensory coöperation we must take the term *object* in a much wider meaning than is commonly used in perceptual investigations. For one thing, the object perceived in everyday life is more than a geometrical or temporal pattern of specific qualities; it is even more or less independent of these qualities. Galli (22), for example, gives a striking illustration of this fact. He produced a perceived movement by means of a succession of heteromodal stimuli, a light and a touch, a sound and a touch, and the like. *O* reported 'something moving' from one place to another, but very often that 'something' was neither visual, tactual, nor auditory. It was just 'an object.' If, as some readers may, we were to contend that such an object is not 'perceived,' but is 'judged' or 'thought,' we would get nowhere. The 'something' which moves in these instances is just as immediately there as the railroad train which moves across our field of vision.

We may note that similar observations have come out of studies of perceived movement within a single modality. [For summaries of the literature on this topic see Neff (57) or Koffka (44).] The so-called 'objectless movement' or 'Phi' of Wertheimer (84, p. 222) and the 'tunnel movement' sometimes referred to (Koffka, 44, p. 1172) apparently involve something of the same kind of movement

described by Galli. The only difference is that Wertheimer and others mean by 'object' simply a collection of sensory qualities. When visual quality disappears in visually perceived movement, there must be no object in this sense, but in a wider sense there still is an object (cf. Erismann, **13**). There is still 'something moving.'

The possibility of objects without any sensory qualitative pattern makes possible the point of view that qualitative pattern, even when present, is often more or less incidental. Just as shadow and illumination are perceived as incidental to the 'true color' of an object, so specific qualitative pattern may be incidental to other, independent properties of an object, such as steadiness, movability, usefulness, and so on. It is necessary to understand the processes involved in apprehending neutral qualitative pattern, but this by no means tells the whole story.

Causal Integration. Another type of integration of objects which is evident even in studies of 'purely sensory' impression is the perceived object which is the common source of two or more kinds of quality. In Klemm's experiments (**42**) we find one example of this kind. When he was determining limens for spatial separation with disparate stimuli, he undertook one series in which the visual stimulus was an illuminated telephone receiver, and the sound emanated from another receiver. One of the few *O*'s exhibited a much increased limen for separation under these conditions, so that the sound source had to be 12° from the light before it was heard as in a different place. Other *O*'s (Klemm does not state how many) suspected a trick. These *O*'s showed limens even lower than sensory induction would lead us to suspect. Klemm says that these *O*'s 'searched' to hear the sound in a place separated from the light because of their suspicion. The result was that they reported separation even when the lighted telephone was actually the source of the sound.

The difference between the two cases is that the first *O* perceived a single object which had visual qualities and at the same time was the *source* of the sound. Such an attribute of 'being a source of sound' is certainly neither a pattern of qualities (either visual or auditory) nor a spatial attribute. It is a property which belongs among what we shall call 'dynamic' characteristics of an object. Such properties can be as directly perceived as color and play a great part in integrating the total sensory mechanism. Klemm passes over this result and others from everyday life with the comment that here we have 'association' and knowledge entering in, so that we are no longer dealing with pure sense impressions. In other words, Klemm,

like many others, shies away as soon as a factor which makes meaningful objects out of 'bare impressions' enters the picture.

Similar instances are barely mentioned by Zietz and Werner (89). In some instances (p. 243) the influence of auditory rhythm upon visually perceived movement involved a 'causal' integration of the visual and auditory patterns. The visible object was perceived as 'scratching the wall' and thus producing the sound pattern.

In a study of the constancy of perceived loudness with changes of distance of the sound source, Mohrmann (53) performed one series in which the source was visible to *O*. Loudness constancy occurs without vision, but it is further increased by the visual perception of the sound source.

To 'explain' such facts as coming under that all-inclusive term 'association' is, of course, no explanation at all. Instead of avoiding the issue in this way we need further investigation of the actual factors underlying the perception of such causal integrations. Such knowledge would not only further our understanding of intersensory coöperation, but it would probably add to our knowledge of the relations of perceiving to comprehending and thinking, as the writer has suggested elsewhere (62). The worlds of perceiving and thinking cannot be artificially cut off from one another without a loss to our knowledge of each.

Imaginal Coöperation. So far we have considered coöperation only in instances where two or more sensory systems are set in operation by outside stimuli. There are other instances where coöperation occurs in spite of the limitation of stimulus to a single modality.

Experiments upon cutaneous localization are especially full of facts of this kind. In Washburn's early experiments (81) upon this topic, much was made of visual 'imagery' as an actual factor in cutaneous localization. That is, 'imagery' is treated not merely as an accompaniment of the tactual perception, but as an aid and contribution. Washburn attributes the greater ease in perception of impressions oriented transversally on a limb to greater ease in visualizing the relations of the tactual pattern to the visually 'imaged' contours of the limb. She also believes that the differences in two-point sensitivity on different portions of the body are attributable partly, at least, to the smaller size of these areas and the sharper contours involved, rather than to degree of practice. The tip of the nose, for example, has relatively little practice, yet shows high sensi-

tivity. The limens were smaller when *O* was encouraged to visualize than they were when he was asked to suppress visualization.

Later experiments along the same line were performed by Pillsbury (**60**) and by Parrish (**58**). Pillsbury found little difference between average error of localization with instruction to visualize and the error with instruction not to visualize. He concludes from this quite properly that an observer cannot control visual imagining sufficiently in such an experiment. Parrish had his *O*'s point toward the skin in localizing without actually touching it. Here the errors were increased when visual imagining was restricted according to instruction.

Although it is regarded as an experiment upon 'set' or 'expectation,' Geissler's experiment (**23**) upon auditory localization bears a certain resemblance to the experiments upon tactual localization. *O*'s were to localize sounds under various instructions—including the instruction to *expect* the sound in a certain half or quarter of the field. It was found that the errors were changed 30 to 40%: increased when the sound came from a nonexpected quarter, and decreased when the sound came from the expected quarter. In describing what occurred under the instruction to 'expect' the sound from a certain quarter, *O*'s report that much of the expectation involves visual imagining of the place, or kinesthetic imagining of pointing in the expected direction. We might, therefore, partially explain the shifts in localization under expectation as the result of 'fitting the sound into' the visually imagined situation. If this is true, we have another kind of intersensory coöperation.

Kinds of Coöperation. To summarize, the coöperation of sensory systems in perceiving the spatial attributes of objects may have the following results: (a) excitation of one system may modify spatial properties within another modality (*e.g.* the kinesthetic contribution to visual space); (b) various systems may coöperate to produce an object which is 'supramodal,' *i.e.* which has properties outside of any modality (*e.g.* Galli's moving object); (c) two or more systems may coöperate to produce an object in which qualities derived from the different modalities are integrated into a meaningful whole, especially a dynamic or active object (a visual object is the *source* or *cause* of a sound).

Result (a) indicates that the effect of a stimulus upon perception is always conditioned upon the general orientation and posture of the body, which constitutes a spatial framework to which outside objects

are related. We have already found some implications of this fact in discussing Goldstein's results. The other two, (b) and (c), imply that coöperative function is responsible for, and is in turn determined by, the perception of objects as much more than kaleidoscopic, haphazard patterns of sound, color, and pressure. Under the influence of training and knowledge, as well as of coöperative function, objects acquire dynamic, causal, and meaningful attributes and are put together into a total spatial framework. This world of objects in turn determines further sensory interrelations.

(c) *Reorganization of Spatial Properties Under Influence of Reversed or Distorted Cues.* Sensory interrelations which are so stabilized that we scarcely notice their existence can often be brought into a focal position by means of some kind of distortion of sensory 'cues' for space. Prismatic inversion or displacement of the visual field along the lines first suggested by Stratton (**71, 72, 73**), transposition of the two ears by acoustical devices (Young, **87**), or reversal of hand-eye coördination in mirror-tracing, all are common techniques which bring out these facts.

Most of these studies were undertaken with the intent of finding out whether 'learning' takes place in spatial perceiving and usually to find out whether 'complete' reorganization takes place, *i.e.* whether the world will eventually look 'right side up' after wearing prismatic lenses for a sufficient period. We are not interested in discussing these problems here. It seems obvious enough at this stage of our knowledge of perception that learning takes place. Whether complete relearning of visual cues ever could be accomplished is beside the point, since we should be trying to overcome in two or three weeks the results of a lifetime of development.

In all of these experiments reorganization of intersensory relations takes place, and all of the papers under this topic are full of interesting examples and facts relating to the coöperative production of a spatial world. The reader interested in perception would be repaid by a careful reading of some of these papers.

In experiments with continuous wearing of inverting lenses, it is often found difficult to express what happens in terms which will be intelligible to the reader who has never experienced the situation. We find in Stratton (**72**), for example, apparently contradictory statements. The contradiction seems to rest usually upon the use of words in different meanings at different times. As he describes the daily events, we gather from Stratton that touch gradually becomes fitted into the visual scene. That is, when first putting on

the glasses, a pressure on the skin does not 'feel' where it 'looks.' Later, however, Stratton finds that more and more often the pressures feel as though they are in the same place as they 'look.' Similarly, kinesthetic qualities sometimes become reversed to fit the visual scene. Stratton notes that he came to feel eye-movements as 'up' when he looked at the sky, even though his eyes had actually to turn downward to see it (72, p. 480). In conclusion, Stratton makes the statement that neither touch nor vision has become reversed as a result of practice, but rather that the visual translation of touch has become reorganized. This seems at first a contradiction to what has been said before. Since, however, within vision alone, and within touch alone, there are no contradictions even with the visual field reversed, the contradiction and the resultant reorganization are bound to come about with respect to the *relation* between touch and sight. If we take touch as our standard of reference, then vision has been reorganized, and if we take vision as our standard, then touch has been changed.

Since such standards of reference as 'up-down' and 'right-left' become confused under the conditions of these experiments, we cannot be sure, in many cases, whether a writer is taking a visual, a tactual, or an absolute gravitational standard of reference. Ewert (14) is especially confusing from this standpoint. For example, he speaks of head-movements as unchanged when they follow their ordinary directions in *absolute* space, whereas they are actually reversed with respect to the visual pattern which guides them (Carr, 6, p. 38).

Formation of New Integrations. Let us, therefore, confine ourselves to discussing certain results which are not so confused by shifting standards of reference. Peterson (59) used a pair of lenses which inverted both visual fields. As a result, the ordinary stereoscopic factors were reversed, and solid objects tended to look hollow. A box, however, which appeared to be a hollow place in the floor under purely visual inspection became normally solid *in visual appearance* when it was touched. Tactual perception not only corrected behavior, therefore, but actually modified the visual appearance of the object.

Stratton (72), Ewert (14), and Peterson (59) all note the fact that auditory localization tends to be pulled into line with the visual pattern. That is, sounds are heard as coming from the visually perceived source, even with the visual field reversed. In similar fashion, Young (87), who artificially reversed the cues for auditory perception, found that visual perception of the sounding object could

override the reversed auditory cues. Young concludes from his observations that there are two distinct kinds of auditory localizing activity. One of these is purely audiomotor and is not influenced by practice in continually wearing the pseudophone. That is, with vision ruled out, perception of direction in hearing remained reversed throughout the experiment. Localization involving visual coöperation, however, gradually came back to normal. The audiomotor process met with no contradiction, since it was unchecked by vision, and so there is no reason to expect it to become changed with practice.

Stratton and others describe the visual field as looking very 'strange' when the glasses are first put on and also note that this strangeness wears off with time. One factor involved here is probably the visual 'swinging,' which will be discussed shortly. Another, which Stratton describes more fully than any of the others, is a matter of great importance to perceiving in general.

Stratton notes that, in the early days of the experiment, everything outside of the visual field is imagined in the 'old' orientation. Gradually, however, he comes to imagine more and more of his surroundings outside of the field of view in consonance with the reversed visual orientation. In other words, direct perception and the imagined continuations of the immediate field are no longer at odds with one another. This may be an important factor in reducing the strangeness of the new visually perceived scene.

Such descriptions illustrate very well the fact that the 'immediately' perceived field is not cut off sharply from the rest of our familiar world. Instead, it is set in a context of other objects and scenes, remembered and imagined in varying degrees of definiteness. These extensions of the boundaries of immediately perceived space not only make it possible for us to get about, but also contribute to the 'naturalness' and familiarity of our everyday surroundings.

The 'swinging' movements of the visual field, mentioned above, should receive more attention. All of the writers on this topic note that the visual field 'swings' about with head-movements of the individual wearing inverting lenses. As time passes, these swinging movements drop out. Carr (6, pp. 37–38) gives a physical explanation for these swinging movements. *O* has to move his head in a direction opposite to that where an object to be fixated appears. The result is that the object appears to move across to the new fixation point and appears to move twice as far as the head has moved. Carr's explanation shows why swinging movements appear in the first place,

but it does not explain the disappearance of these movements with practice. If a more exact study of the factors involved in this reorganization could be made, we should be on the way to a better understanding of our normal perception of the stability of our visual world. These experiments show that the perceived world can be perceived as stationary and fixed even when retinal images undergo more pronounced movements than normal. The problem is to determine what factors contribute to this perception of spatial stability.

Other investigators have attacked similar problems with slightly different techniques. Brown (4) used prisms which tilted each visual field 75°. Since he was interested mainly in measuring objective accuracy of performance, there is little in his results which throws light upon intersensory relations.

Wooster (86) used prismatic spectacles which shifted the visual field 21° laterally and which were worn only during the experimental periods. With the glasses on, and the arms out of sight, *O* was to reach out to locate objects. In some series the object was both visible and sounding; in other parts of the experiment *O* was allowed to correct his localization until he had touched the object, or he was allowed to see his hand after he had made his localization. The problem was to determine which factors would be most effective in correcting localization.

Even with no knowledge of the accuracy of judgment and with nothing but the visual appearance of the field as a cue, *O* tended to grow gradually more accurate in pointing to the test objects. Wooster regards this as a readjustment to a discrepancy between the 'foveal' front and the 'head' front (p. 45). In other words, it involves the orientation of parts of the body in visually perceived space, and is thus related to what we have said of Goldstein's experiments (p. 676).

When the object was a sound source as well as being visible, readjustment came about more rapidly, even in some cases where *O* did not perceive the sound as coming from the visible object. This would seem to be a kind of spatial induction like that in Klemm's experiments. When *O* was given some cue to his accuracy, there was rapid improvement, even though he was instructed to make no attempt to improve and to react only to the visual appearance of the situation. This is an extremely difficult instruction to follow, but if it was successfully carried out, it means that the visual scene *itself* was gradually fitted to the kinesthetic and tactual framework, so that a

deliberate adjustment was no longer necessary. At any rate, since the most rapid improvement came about under conditions which allowed for some kind of coöperation of kinesthesis, touch, hearing, and vision, we can conclude that this is the effective factor.

Reorganization of Guidance in Drawing. Förster (17) made use of mirror-tracing to study reorganization of visual, tactual, and kinesthetic coöperation. As habituation progresses her *O*'s report that they reach a stage where they 'forget the mirror,' and performance is guided directly by vision just as it is in ordinary tracing. As further evidence of the dominance of vision in this activity, Förster studied the after-effect of the tracing practice upon later drawing. After the tracing series was completed, her *O*'s were asked to reproduce the figures previously traced with the mirror. In reproducing them, they made one drawing while looking in the mirror and another with normal drawing. In reproducing them without the mirror *O* drew the figure in reversed orientation, *just as it had previously appeared in the mirror.* No discrepancy between the movements made in this reversed reproduction and the previous movements was noticed by *O*. Even with the eyes closed, this reversed reproduction took place, which is evidence that visual remembering, rather than kinesthetic memory of the motor pattern, guided the performance.

Förster makes from this a case for the great dominance of vision over other sensory patterns. The fact of dominance is not itself so important, however, as the manner in which vision exerts its control. A much more important conclusion can be drawn—namely, that the kinesthetic and motor patterns are integrated with the visual guidance in a very labile manner, so that in a strange situation (mirror-tracing) the relationship is easily reorganized. That this reorganization is dependent upon the total situation, including the task to draw with the mirror, is shown by the fact that the older and more common pattern of integration with vision is completely restored as soon as the mirror is removed.

All of this information derived from experiments upon spatial reorganization under distorted cues supports the conclusions already drawn in the preceding section. The reorganization takes place most readily when the organism is permitted to perceive objects and situations in a meaningful and dynamic way. These experiments also illustrate in a very striking way the numerous and complex ways in which the various systems coöperate with one another in building a coherent, stable, and dynamic world of spatial objects.

(D) *Intermodal Relations in Perceiving Other Nonspecific Properties of Objects*

Among the characteristics of objects which are not specific to any one modality are, in addition to spatial properties, weight; surface texture, including roughness, smoothness, stickiness, and the like; internal properties, such as hollowness and solidity; and the material of which an object is composed.

Surface texture as perceived tactually is discussed at length in Katz's "Tastwelt" (**40**) and in the extensive literature on 'touch blends.' In order to shorten this discussion, we must pass over this topic briefly, merely noting that most of these qualifications depend upon the intimate coöperation of several of the skin modalities and often of kinesthesis and vision as well.

The 'Material Illusion.' Weight and the internal properties of objects are very closely related, and all of these involve an intersensory coöperation of a complex sort. For purposes of simplicity let us consider the superficial and deep organs of the skin and muscles as a single sensory system and consider its relations to other systems, especially vision. This does little violence to the facts, since the skin and muscle receptors work together so intimately in perceiving weight that it is difficult to separate them experimentally.

Tactually perceived weight is markedly influenced by the visually perceived properties of objects, especially the *material* of which the object is made. Seashore (**68**), Friedländer (**21**), and Wetenkamp (**85**) have investigated what is known as the 'material illusion.' If an iron object is made abnormally light by hollowing it out, or if a wooden cylinder is filled with lead, the iron object tends to be underestimated with respect to its physical weight and the wooden object to be overestimated. That is, perceived weight is not exactly correlated with intensity of tactual stimulation, but is influenced by the perception of the material out of which an object is made.

Friedländer believes that the size-weight illusion and the material illusion rest upon different bases. The material illusion is gradually lost with repetition, while the size-weight illusion remains (**21**). The explanation offered is that the material illusion is almost entirely a matter of 'expectation' that the object will be of a certain weight, the expectation occurring before the weight is lifted and contrasting with the tactually perceived heaviness. The size-weight illusion, on the other hand, involves an additional factor. In perceiving an object,

tactually, we ordinarily 'objectify' the weight (**20**); that is, we ordinarily perceive the weight as *out in the object,* rather than as pressure upon the skin. In the size-weight illusion the 'objectified' total weights are distributed over different volumes. In fact, *O* is not reporting *weight* at all, but *specific gravity,* and the illusion is really not an illusion at all. *O* is simply unable to report on weight being influenced by the striking differences in density involved.

We do not intend to cover fully the problem of the size-weight illusion here. It is not peculiar to visual-tactual relations, although Friedländer (**21**) and others (**79**) have shown that it can result from purely visual perception of size. Friedländer's theory is worth mentioning not only because of its bearing upon the perception of material, but also because it illustrates in general what we have said about perceiving the inner constitution of objects.

Wetenkamp was able to modify artificially the material illusion by having *O* repeatedly lift objects which were abnormally light or heavy (**85**). These consisted of a hollow iron cylinder and a brass cylinder filled with lead. After this training or '*Einstellung*' series, *O* tended to judge normal iron objects as heavier and brass objects as lighter than he had before the training series. Wetenkamp attributes this change to a change in the visual appearance of the object due to repeated manipulation. The training series has the result that the iron begins to appear *visually* light. Effort in lifting is subsequently automatically adjusted to the visual appearance of the objects, so that too little effort is used later in lifting a normal iron cylinder. The result is that the normal object appears *tactually* heavy because of the inadequate muscular contractions used in lifting.

Wetenkamp used a number of controls to show that the phenomenon was attributable only to the visual factor. When the training series was carried out with *O* blindfolded, it had no effect upon subsequent judgments. The effect could not be due to a rhythm or the 'motor set' of Müller and Schumann (**56**), since the effect still held if different arms were used for the training and comparison series.

Vision was given unique importance in Wetenkamp's experiments, however, since the weights were lifted by means of identical handles. The experiments therefore demonstrate that the material illusion *can* come about through the visual perception of material out of which an object is made. They do not eliminate the possibility of a similar material illusion *within touch alone.* But we may expect

that touch would not be markedly affected by the slight tactual differences between iron and brass.

Ach, who inspired Wetenkamp's experiments, holds to an old notion that sensations are internal bodily feelings which have to be projected outward into space in perceiving external objects (1). He regards these experiments as studies of 'objectification'; that is, the repeated lifting of a hollow object results in a projection of the lightness into the external object, so that the object retains this characteristic when perceived visually. We do not, however, have to accept this outworn approach in order to make use of Wetenkamp's facts. Manipulation of the object changes the visually perceived 'weight' or heaviness in much the same way that the visual solidity of an object was determined by manual perception in Peterson's experiment (cf. 683).

'Color-Weight.' We should mention here those experiments which are designed to study weight as a property of colors. Actually, these experiments are designed to answer the question whether an object of one color looks heavier than an object of some other color. The results, however, are sometimes treated as though they involved a property of color in the abstract, a property comparable to hue, brightness, or saturation (43). In the writer's opinion, the techniques used in these experiments tell us nothing concerning color in the abstract, even if weight *is* a property of color *per se*. The objects investigated are solid objects which are to be judged either visually or visually and tactually (10, 74, 80); or color discs are placed at opposite ends of a lever, and *O* places a fulcrum so that the lever appears in balance (43, 54). In one study (5) the whole problem was attacked indirectly by placing combinations of colors in geometrical forms, asking *O* which spatial arrangement was most pleasing and his reasons for liking a particular arrangement. Here, some *O*'s spontaneously reported that they liked a darker color below a lighter one, because the darker color looked heavier. Even here, however, the object, although merely a triangle or circle in a plane, had balance and other properties beyond that of mere color.

We will not enlarge upon this discussion because the results are still contradictory, and very few reliable differences have been found. The only general rule which has been agreed upon is that darker objects tend to appear heavier than light objects.

The major conclusion to be drawn from this summary of intersensory relations in perceiving weight is that manual perceiving

endows objects with characteristics which become permanent properties of the object and remain even when the object is perceived through visual channels alone. These visual properties which result from past manual perceiving, influence, in turn, other tactual perceptions. To put it in more general terms, the world of objects is the progressive result of a long series of varied stimulations. The results of one perception carry over to another situation where only a small part of the stimulus pattern remains the same.

Conclusions

We have found a considerable number of experimental papers bearing upon the interrelation of sensory systems in perception. The papers discovered, however, are scattered over several different periods in the history of psychology, were undertaken under many divergent interests and points of view, and bear scant relation in subject matter or technique to one another. Consequently, this review may raise more problems than it solves. In fact, one purpose in presenting this paper is to point out that a topic of major importance in perception is sorely in need of further investigation, new techniques of study, and more serious consideration as a problem.

We find that the bulk of more or less integrated research upon the interrelations of the senses has been concerned with highly abstract and artificial interactions at what used to be called a 'purely sensory level.' In investigations of this kind, instead of dealing with the kind of perceiving of most interest in everyday living, the perceiving of objects, scenes, events, and situations, consideration is artificially limited to certain aspects of objects abstracted from the total situation and from all 'meaning.' When this is done, it is found that there still remains a certain dynamic interplay between modalities, *e.g.* an acoustic stimulus influences visual acuity, or color quality of some instable object like an after-image. Even here, among artificial abstractions from objects, then, it is evident that sensory systems are a part of a unified organism and by no means isolated from one another.

In introducing this paper we preferred to call the approach exemplified in the experiments just mentioned a 'neutral' approach as distinguished from an approach which deals with significant, dynamic, independent objects. This distinction is important for many of the problems we have considered. For example, we mentioned studies of the apparent warmth of colors. These studies were purely neutral, in that they investigated the warmth of colors irrespective of the

object to which the color belonged. We found no experimental consideration of the apparent visual coldness of ice, or the visual warmth of a glowing coal, which depends, clearly, upon more than color alone. Experiments on the latter would have gone beyond the neutral approach.

We found investigations of perceived weight which followed both lines of regard. We found studies of weight as influenced by visual perception of the material out of which the object is made—in other words, by the visual perception of a complete object which is more than a mere sensory pattern. Contrasting with this we found neutral experiments which purported to study the weight of color *per se*. Again, localization of tones was investigated from the point of view of the *neutral* effects of auxiliary light, that is, light which is perceived as having nothing sensible to do with the sound, coming merely as an accidental accompaniment. Little was done with the fact that localization of sound can be influenced much more markedly by visually apprehending an object *as the source of a sound,* with a sensible and intimate relation between sight and sound.

The impetus for examining the neutral relationships between sense departments lies, of course, in the fact that in such experiments the effects of the past life of the observer, and the development of perceiving during that life, can be ruled out or ignored. The problem is thus vastly simpler, but, at the same time, the investigator is forced to limit his generalizations to a kind of perceiving which occurs rarely in our everyday lives. Perhaps it is all the more surprising, therefore, that neutral experiments have definitely demonstrated dynamic interplay between the senses.

A more robust, a more common, and a more stable form of intersensory relationship comes about when we study perceiving as a process which turns out objects, events, and situations rather than bare neutral qualities and configurations. Duncker (11) has shown the direct influence of past acquaintance with an object upon its color or taste. White chocolate, for example, *tasted* less like chocolate than the ordinary brown kind. Duncker divides the effect of past experience into *direct* effects like this and *indirect* effects, where experience builds up frames of reference which, in turn, affect the specific characteristics of objects. To pass off such factors as 'mere' matters of association or conditioning does more harm than good. It suggests that the problem is solved.

In order to reach eventual understanding of coöperative functions of the senses, as well as of many other problems of perceiving, it is

necessary to *start* with the perceived object and its properties—*all* of its properties, not only those which happen to be related in simple fashion to the physical stimulus. Many of the properties of objects are not determined in any simple way by the immediate stimulus, but involve a whole set of factors including stimulus as a rather minor condition.

In addition we must recognize that our perceived world is 'prefabricated' and perceptive function is largely prepared and 'set in type' ahead of time, so that a stimulus is often no more than a trigger setting off this predetermined activity. Through repeated perceiving we build up frames of reference into which new objects are immediately set, and we prepare typical kinds of objects and relations between objects as type-forms into which new occasions are fitted.

To speak of 'perceiving *an* object' is itself an abstraction. We are already perceiving when a given object appears, and the new object is set into relation to the situation already prepared and into the molds prepared by the whole past life of the individual. To summarize briefly, then, the nature of any given object as perceived is determined by preceding perceptions and is integrated with them into a meaningful whole. Thus, it is important to consider the characteristics of perceived objects not only as results and indicators of activity, but also as determiners of future performances of similar kind.

There are neglected characteristics of objects which must be investigated along with the spatial, temporal, and qualitative properties already so widely considered. Until we know something of the conditions underlying the following characteristics there will be enormous gaps in our understanding of perceiving: (a) stability in space, (b) identity and continuity of the perceptive world, (c) dynamic and causal properties of objects, and (d) inner constitution and material.

(a) Visual stability is dependent upon a finely adjusted relation between kinesthetic and tactual patterns of the whole body, and visual patterns. Experiments upon inversion of the visual field have shown the effects of disrupting this adjustment, and have shown that a new coördination can be built up in a relatively short time. We need further studies of the manner in which this coördination is rebuilt and of the factors involved.

(b) Objects are perceived as identical in spite of changes in time and space (*e.g.* Ternus, **75**), and also in spite of changes from one sensory modality to another (Galli, **22**). Thus, we can perceive

movement as a result of two stationary stimuli affecting two distinct sensory modes. A single object moves and is perceived as responsible for the two kinds of stimulation. To put the statement in another way, objects as perceived transcend the sensory pattern of a single mode and exist in a single spatial frame which is continuous from one modality to another.

Similarly, objects remembered and imagined appear in the same spatial framework as perceived objects, and there is spatial and temporal continuity common to perceiving, imagining, and remembering. All of this would indicate that a genetic study of the development of spatial frames of reference would throw light upon fundamental characteristics of perceived objects and upon intersensory coöperation.

(c) We have noted that one characteristic of perceived objects which contributes to the integration of vision and hearing is that an object may be perceived as *causing* or *producing* a given sound. Here visual and auditory quality are not only in the same continuous spatial framework, but they are actually linked by way of a directly perceived sensible relationship between the two kinds of quality. This relationship is but one of the many dynamic properties which objects acquire in certain contexts. The term *dynamic* is used here in the sense that objects are apprehended as *doing something* or being capable of doing something. In the 'movie' we may know abstractly that the sound is artificially synchronized with the movements on the screen and comes out of a loud-speaker. Perceptively, however, no matter how well we know this, we still hear the sound *coming out of* the actor's mouth and produced by him. Young's experiments showed that this factor is so powerful that all of the 'purely auditory' factors in the perception of direction are completely overridden when they fail to fit into the dynamic relations to the visual field.

Other kinds of dynamic property worthy of investigation are evident in perceiving any event which involves temporal continuity. We perceive the *effort* of the racer or of the locomotive, a *cause-and-effect* relation between the motion of throwing a stone and the splash of the water. These characteristics of the event are not the results of reflection or 'reasoning.' In many cases we know better, but the perceived characteristic persists. They are intimate properties of the perceived scene which tie the varied and disparate sensory patterns together much more intimately than any of the *neutral* intersensory relations could possibly accomplish.

(d) We found that the visually perceived material of which an object is composed plays a measurable part in tactually judging the weight of the object. In other words, when we see an iron object we do not see merely a certain pattern of gray; we may also see the object as heavy. The tactual pattern is integrated with this visual perceiving as a part of the total situation, or, to put it in another way, the tactual pattern is set in a context of the visual perception of the weight and material of the object. Probably, also, the tactual pattern exerts a reciprocal effect upon the visual appearance, since the visual impression of heaviness is subject to modification with repeated manipulation of the object.

When we perceive objects with one or more of these characteristics we are dealing with objects which are independent of the immediate configuration of 'sensory qualities' and, very often, independent of any particular modality. They are the coöperative product of several or all of the modalities, and they determine, in turn, further intersensory integration.

BIBLIOGRAPHY

1. Ach, N. Finale Qualität (Gefügigkeitsqualität) und Objection. *Arch. ges. Psychol.*, 1932, Ergbd. **2**, 267–366.
2. Allers, R., & Schmiedek, O. Über die Warhnehmung der Schallrichtung. *Psychol. Forsch.*, 1925, **6**, 92–112.
3. Bentley, M. The new field of psychology. New York: Appleton-Century, 1934.
4. Brown, G. G. Perception of depth with disoriented vision. *Brit. J. Psychol.*, 1928, **19**, 117–146.
5. Bullough, E. On the apparent heaviness of colours. A contribution to the aesthetics of colour. *Brit. J. Psychol.*, 1907, **2**, 111–152.
6. Carr, H. A. An introduction to space perception. New York: Longmans, Green, 1935.
7. Child, I. L., & Wendt, G. R. The temporal course of the influence of visual stimulation upon the auditory threshold. *J. exp. Psychol.*, 1938, **23**, 108–127.
8. Cohen, N. E. Equivalence of brightnesses across modalities. *Amer. J. Psychol.*, 1934, **46**, 117–119.
9. Dashiell, J. F. Some rapprochements in contemporary psychology. *Psychol. Bull.*, 1939, **36**, 1–24.
10. DeCamp, J. E. The influence of color on apparent weight. A preliminary study. *J. exp. Psychol.*, 1917, **2**, 347–370.
11. Duncker, K. The influence of past experience upon perceptual properties. *Amer. J. Psychol.*, 1939, **52**, 255–265.
12. Ebbinghaus, H. Ueber Nachbilder im binocularen Sehen und die binocularen Farbenerscheinungen überhaupt. *Pflüg. Arch. ges. Physiol.*, 1889, **46**, 498–508.

13. ERISMANN, T. Wahrnehmungslehre und Scheinbewegung. I. Wesen und Entstehung der Scheinbewegung, betrachtet und erklärt im Lichte einer Wahrnehmungstheorie. *Arch. ges. Psychol.*, 1938, **100**, 305–386.
14. EWERT, P. H. A study of the effect of inverted retinal stimulation upon spatially coordinated behavior. *Genet. Psychol. Monogr.*, 1930, **7**, 177–363.
15. FELDMAN, S., & WELD, H. P. Perception. *In* Boring, E. G., Langfeld, H. S., & Weld, H. P., *Introduction to Psychology*. New York: Wiley, 1939. Pp. 411–438.
16. FISCHER, B. Der Einfluss der Blickrichtung und Aenderung der Kopfstellung (Halsreflex) auf den Bárányschen Zeigeversuch. *Wien. klin. Wschr.*, 1914, **37**, 1169–1170. (Same paper published in *Jb. Psychiat. Neurol.*, 1915, **35**, 155–158.)
17. FÖRSTER, N. Die Wechselbeziehung zwischen Gesichts- und Tastsinn bei der Raumwahrnehmung. *Psychol. Forsch.*, 1929, **13**, 64–78.
18. FREUND, L. Über den Einfluss des Lichtes auf die Funktionen des Gehör- und des Geruchsorgans. *Strahlentherapie*, 1929, **34**, 110–116.
19. FREUND, L., & HOFMANN, L. Licht und Hören. *Med. Klinik*, 1929, **25**, 226–228.
20. FRIEDLÄNDER, H. Die Wahrnehmung der Schwere. *Z. Psychol.*, 1919–1920, **83**, 129–210.
21. FRIEDLÄNDER, H. Über Gewichtstäuschungen. *Z. Psychol.*, 1920, **84**, 258–291.
22. GALLI, P. A. Über mittelst verschiedener Sinnesreize erweckte Wahrnehmung von Scheinbewegungen. *Arch. ges. Psychol.*, 1932, **85**, 137–180.
23. GEISSLER, L. R. Sound localization under determined expectation. *Amer. J. Psychol.*, 1915, **26**, 268–285.
24. GOLDSTEIN, K. Über induzierte Tonusveränderungen beim Menschen (sog. Halsreflexe, Labyrinthreflexe, usw.). VIII. Über den Einfluss unbewusster Bewegungen resp. Tendenzen zu Bewegungen auf die taktile und optische Raumwahrnehmung. *Klin. Wschr.*, 1925, **4**, 294–299.
25. GOLDSTEIN, K. Über induzierte Veränderungen des "Tonus." *Schweiz. Arch. Neurol. Psychiat.*, 1926, **17**, 203–228.
26. GOLDSTEIN, K., & RIESE, W. Über induzierte Veränderungen des Tonus (Halsreflexe, Labyrinthreflexe und ähnliche Erscheinungen). III. Blickrichtung und Zeigeversuch. *Klin. Wschr.*, 1923, **2**, 2338–2340.
27. GOLDSTEIN, K., & ROSENTHAL-VEIT, O. Über akustische Lokalisation und deren Beeinflussbarkeit durch andere Sinnesreize. *Psychol. Forsch.*, 1926, **8**, 318–335.
28. GOTOH, C. Ueber die Zentrale Beeinflussung der Sehschärfe. *Acta Soc. ophthal. jap.*, 1931, **35**, 887. (Summarized in Kravkov, **48**.)
29. HARTMANN, G. W. I. The increase of visual acuity in one eye through illumination of the other. *J. exp. Psychol.*, 1933, **16**, 383–392.
30. HARTMANN, G. W. II. Changes in visual acuity through simultaneous stimulation of other sense organs. *J. exp. Psychol.*, 1933, **16**, 393–407.
31. HARTMANN, G. W. The facilitating effect of strong general illumination upon the discrimination of pitch and intensity differences. *J. exp. Psychol.*, 1934, **17**, 813–822.

32. HARTMANN, G. W. Gestalt psychology: a survey of facts and principles. New York: Ronald Press, 1935.
33. HONZIK, C. H. A note on Hartmann's experiments showing the effect on visual acuity of simultaneous stimulation of other sense organs. *J. exp. Psychol.*, 1933, **16**, 875–878.
34. HORNBOSTEL, E. M. v. The unity of the senses. *In* Ellis, W. D., *A Source Book of Gestalt Psychology*. New York: Harcourt, Brace, 1938. Pp. 210–216. (Reprinted from *Psyche, Lond.*, 1927, **7**, 83–89. Trans. from Die Einheit der Sinne, *Melos, Z. Musik*, 4.)
35. HORNBOSTEL, E. M. v. Über Geruchshelligkeit. *Pflüg. Arch. ges. Physiol.*, 1931, **227**, 517–538.
36. JACOBSON, E. Experiments on the inhibition of sensations. *Psychol. Rev.*, 1911, **18**, 24–53.
37. JOHNSON, H. M. The dynamogenic influence of light on tactile discrimination. *Psychobiology*, 1920, **2**, 351–374.
38. JUHASZ, A. Über eine neue Eigenschaft der Geruchsempfindungen. *Ber. IXth Kongr. exp. Psychol.*, 1926, 178–179.
39. JUHASZ, A. Zur Grundlegung der Geruchspsychologie. *VIIIe Congr. int. Psychol.*, 1926, 305–309.
40. KATZ, D. Der Aufbau der Tastwelt. *Z. Psychol.*, 1925, Ergbd. **11**, 1–270.
41. KISS, J. Über das Vorbeizeigen bei forciertem Seitwärtsschauen. *Z. ges. Neurol. Psychiat.*, 1921, **65**, 14–17.
42. KLEMM, O. Lokalisation von Sinneseindrücken bei disparaten Nebenreizen. *Psychol. Stud.*, 1909, **5**, 73–162.
43. KOCH, B. C. The apparent weight of colors. *Ohio St. Univ. Stud., Contr. Psychol.*, 1928, No. 9.
44. KOFFKA, K. Die Wahrnehmung von Bewegung. (*In* Bethe, A., *et al., Handbuch der normalen und pathologischen Physiologie*, 1931, XII, 2, 1166–1214.)
45. KRAVKOV, S. W. Über eine zentrale Beeinflussung der Sehschärfe. *v. Graefes Arch. Ophthal.*, 1930, **124**, 76–86.
46. KRAVKOV, S. W. Über die Abhängigheit der Sehschärfe vom Schallreiz. *v. Graefes Arch. Ophthal.*, 1930, **124**, 334–338.
47. KRAVKOV, S. W. Der Lichtirradiationseffekt im Auge in seiner Abhängigkeit von den Gesichts-, Gehörs- und Geruchsnebenreizen. *v. Graefes Arch. Ophthal.*, 1933, **129**, 440.
48. KRAVKOV, S. W. Changes of visual acuity in one eye under the influence of the illumination of the other or of acoustic stimuli. *J. exp. Psychol.*, 1934, **17**, 805–812.
49. KRAVKOV, S. W. The influence of sound upon the light and color sensitivity of the eye. *Acta ophthal., Kbh.*, 1936, **14**, 348.
50. MAASS, H. Über den Einfluss akustischer Rhythmen auf optische Bewegungsgestaltungen. (Sander, F. Ganzheit und Gestalt. Psychol. Untersuch. VIII.) *Arch. ges. Psychol.*, 1938, **100**, 424–464.
51. METZGER, W. Certain implications in the concept of *Gestalt*. *Amer. J. Psychol.*, 1928, **40**, 162–166.
52. MOGENSEN, M. F., & ENGLISH, H. B. The apparent warmth of colors. *Amer. J. Psychol.*, 1926, **37**, 427–428.

53. MOHRMANN, K. Lautheitskonstanz im Entfernungswechsel. *Z. Psychol.*, 1939, **145**, 145–199.
54. MONROE, M. The apparent weight of color and correlated phenomena. *Amer. J. Psychol.*, 1925, **36**, 192–206.
55. MOUL, E. R. An experimental study of visual and auditory 'thickness.' *Amer. J. Psychol.*, 1930, **42**, 544–560.
56. MÜLLER, G. E., & SCHUMANN, F. Ueber die psychologischen Grundlagen der Vergleichung gehobener Gewichte. *Pflüg. Arch. ges. Physiol.*, 1889, **45**, 37–112.
57. NEFF, W. S. A critical investigation of the visual apprehension of movement. *Amer. J. Psychol.*, 1936, **48**, 1–42.
58. PARRISH, C. S. Localization of cutaneous impressions by arm movement without pressure upon the skin. *Amer. J. Psychol.*, 1897, **8**, 250–267.
59. PETERSON, J., & PETERSON, J. K. Does practice with inverting lenses make vision normal? *Psychol. Monogr.*, 1938, **50**, No. 225, 12–37.
60. PILLSBURY, W. B. Some questions of the cutaneous sensibility. *Amer. J. Psychol.*, 1895, **7**, 42–57.
61. ROSENTHAL-VEIT, O. Die Bedeutung der Handstellung und der Reizbeschaffenheit für die Lokalisation taktil dargebotener Formen. *Psychol. Forsch.*, 1923, **3**, 78–105.
62. RYAN, T. A. Dynamic, physiognomic, and other neglected properties of perceived objects: a new approach to comprehending. *Amer. J. Psychol.*, 1938, **51**, 629–649.
63. SCHILLER, P. v. Das optische Verschmelzen in seiner Abhängigkeit von heteromodaler Reizung. (Werner's Untersuchungen, 4.) *Z. Psychol.*, 1932, **125**, 249–288.
64. SCHILLER, P. v. Die Rauhigkeit als intermodale Erscheinung. (Werner's Untersuchungen, 5.) *Z. Psychol.*, 1932, **127**, 265–289.
65. SCHILLER, P. v. Intersensorielle Transposition bei Fischen. *Z. vergl. Physiol.*, 1933, **19**, 304–309.
66. SCHILLER, P. v. Interrelation of different senses in perception. *Brit. J. Psychol.*, 1935, **25**, 465–469.
67. SCHILLER, P. v., & WOLFF, W. Gegenseitige Beeinflussung der optischen und der akustischen Helligkeit. *Z. Psychol.*, 1933, **129**, 135–148.
68. SEASHORE, C. E. Some psychological statistics. II. The material weight illusion. *Univ. Ia Stud. Psychol.*, 1899, **2**, 36–46.
69. SERRAT, W. D., & KARWOSKI, T. An investigation of the effect of auditory stimulation on visual sensitivity. *J. exp. Psychol.*, 1936, **19**, 604–611.
70. STERN, W. General psychology from the personalistic standpoint. New York: Macmillan, 1938.
71. STRATTON, G. M. Some preliminary experiments in vision without inversion of the retinal image. *Psychol. Rev.*, 1896, **3**, 611–617.
72. STRATTON, G. M. Vision without inversion of the retinal image. *Psychol. Rev.*, 1897, **4**, 341–389; 463–481.
73. STRATTON, G. M. The spatial harmony of touch and sight. *Mind*, 1899, N. S. **8**, 492–505.
74. TAYLOR, C. D. Visual perception versus visual plus kinaesthetic perception in judging colored weights. *J. gen. Psychol.*, 1930, **4**, 229–246.

75. TERNUS, J. Experimentelle Untersuchungen über phänomenale Identität. (Wertheimer, M. Untersuchungen zur Lehre von der Gestalt, III.) *Psychol. Forsch.*, 1926, **7**, 81–136.

76. TITCHENER, E. B. Ueber binoculare Wirkungen monocularer Reize. *Philos. Stud. (Wundt)*, 1892, **8**, 231–310.

77. URBANTSCHITSCH, V. Ueber den Einfluss einer Sinneserregung auf die übrigen Sinnesempfindungen. *Pflüg. Arch. ges. Physiol.*, 1888, **42**, 154-182.

78. URBANTSCHITSCH, V. Ueber die Beeinflussung subjektiver Gesichtsempfindungen. *Pflüg. Arch. ges. Physiol.*, 1902, **94**, 347–448.

79. USNADZE, D. Über die Gewichtstäuschung und ihre Analoga. *Psychol. Forsch.*, 1931, **14**, 366–379.

80. WARDEN, C. J., & FLYNN, E. L. The effect of color on apparent size and weight. *Amer. J. Psychol.*, 1926, **37**, 398–401.

81. WASHBURN, M. F. Ueber den Einfluss von Gesichtsassociationen auf die Raumwahrnehmung der Haut. *Philos. Stud. (Wundt)*, 1895, **11**, 190–225.

82. WERNER, H. Untersuchungen über Empfindung und Empfinden. I. Das Problem des Empfindens und die Methoden seiner experimentellen Prüfung. *Z. Psychol.*, 1930, **114**, 152–166.

83. WERNER, H. L'unité des sens. *J. Psychol.*, 1934, **31**, 190–205.

84. WERTHEIMER, M. Experimentelle Studien über das Sehen von Bewegung. *Z. Psychol.*, 1912, **61**, 161–265.

85. WETENKAMP, L. Ueber die Materialtäuschung. Ein Beitrag zur Lehre von der Objektion. *Z. Psychol.*, 1933, **130**, 172–234.

86. WOOSTER, M. Certain factors in the development of a new spatial coordination. *Psychol. Monogr.*, 1923, **32**, No. 146, 1–96.

87. YOUNG, P. T. Auditory localization with acoustical transposition of the ears. *J. exp. Psychol.*, 1928, **11**, 399–429.

88. ZIETZ, K. Gegenseitige Beeinflussung von Farb- und Tonerlebnissen. (Werner's Untersuchungen, 3.) *Z. Psychol.*, 1931, **121**, 257–356.

89. ZIETZ, K., & WERNER, H. Über die dynamische Struktur der Bewegung. (Werner's Studien über Strukturgesetze, VIII.) *Z. Psychol.*, 1927, **105**, 226–249.

PROCEEDINGS OF THE FORTY-EIGHTH ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, INC., PENNSYLVANIA STATE COLLEGE, SEPTEMBER 4, 5, 6, 7, 1940

REPORT OF THE SECRETARY, WILLARD C. OLSON, UNIVERSITY OF MICHIGAN

The American Psychological Association, Inc., held its Forty-eighth Annual Meeting at Pennsylvania State College, State College, Pennsylvania, on September 4, 5, 6, and 7, 1940. A total of 1237 persons registered, 251 being Members, 490 being Associate Members, 58 being newly elected Associates, 18 being newly elected and transferred Members, and 420 being persons not affiliated with the Association.

An analysis of the registration by geographical districts and states is as follows: New England States, 127 (Connecticut 44, Massachusetts 56, Rhode Island 13, New Hampshire 7, Maine 1, Vermont 6); Middle Atlantic States, 517 (New York 262, Pennsylvania 205, New Jersey 48, Delaware 2); South Atlantic States, 130 (District of Columbia 30, Maryland 37, Georgia 5, North Carolina 25, Florida 5, West Virginia 4, Virginia 23, South Carolina 1); East North Central States, 281 (Illinois 106, Indiana 20, Michigan 35, Ohio 109, Wisconsin 11); East South Central States, 35 (Kentucky 7, Tennessee 15, Mississippi 2, Louisiana 5, Alabama 6); West North Central States, 93 (Iowa 40, Kansas 5, Minnesota 30, Missouri 16, South Dakota 0, Nebraska 2, North Dakota 0); West South Central States, 11 (Arkansas 3, New Mexico 1, Texas 5, Oklahoma 2); Mountain States, 6 (Colorado 6, Wyoming 0, Arizona 0, Montana 0, Utah 0, Nevada 0); Pacific States, 28 (California 24, Oregon 2, Washington 1, Idaho 1); Canada, 4; Hawaii, 1; Sweden, 1; Porto Rico, 1; not stated, 2.

The Program for the meeting was printed as the July, 1940, issue of the *Psychological Bulletin*. With a few exceptions the program of 24 scientific sessions, 5 round tables, and 190 papers by Members and Associates was presented as scheduled. Walter S. Hunter presided as Chairman of the section on "Brain Functions" in the absence of Knight Dunlap, who was unable to attend the meeting.

Sidney L. Pressey presided at the section meeting on "Intelligence Tests, II" in place of L. L. Thurstone, who was compelled to leave early. John E. Anderson presided at the general session in the absence of Madison Bentley.

Papers by the following contributors were withdrawn with letters of explanation concerning the circumstances: S. D. Evans, Melvin S. Hattwick, Louis D. Goodfellow, Paul S. Lazarsfeld, T. W. Harrell, and H. B. Reed.

The 9 research and instructional films were presented as scheduled on Wednesday evening, with the addition of a film, entitled "Testing the IQ," by G. M. Gilbert and Henry E. Garrett, of Columbia University.

The Presidential Address on the subject, "The Experimental Embryology of Mind," was delivered by Leonard Carmichael in the Auditorium on the evening of Friday, September 6. The address was followed by a reception in the lounge of Old Main Building at which members of the Department of Psychology were hosts to the Association, affiliated societies, and guests.

The American Speech Correction Association, registering 46 persons, met on September 2 and 3 prior to the opening of the American Psychological Association meetings. The American Association for Applied Psychology, the Psychometric Society, and the Society for the Psychological Study of Social Issues, affiliated societies, held meetings prior and during meetings of the American Psychological Association.

The Psychometric Society, registering 53 persons, arranged a scientific session on "Psychometrics" in collaboration with the Program Committee of the American Psychological Association. The Business Meeting of the Society was held on Wednesday. The dinner meeting on Thursday was followed by the address of the President, Karl J. Holzinger, on "A Synthetic Approach to Factor Analysis." Officers for the year 1940–1941 are Jack W. Dunlap, President; Irving Lorge, Treasurer; and Harold A. Edgerton, Secretary. Dael L. Wolfle and Philip J. Roulon were elected to the Council of Directors.

The Fourth Annual Meeting of the American Association for Applied Psychology was held on September 1, 2, and 3, 1940, in conjunction with the meetings of the American Psychological Association. Two hundred and forty persons registered for the meetings. Twenty-two papers were also presented by members of the Association at the session of the American Psychological Association by

collaboration of the Program Committees. In addition to these there were several symposia, round tables, and panel discussions, as well as a number of conferences dealing with professional problems. A business meeting was held by each of the four Sections, and there was also a business meeting of the Association as a whole. Following the annual dinner the retiring President, Horace B. English, delivered an address on "Fundamentals and Fundamentalism in the Preparation of Applied Psychologists." The President-elect for 1941 is Edgar A. Doll. The time and place of the 1941 meeting of the American Association for Applied Psychology is to be decided by a mail vote of the membership.

The Society for the Psychological Study of Social Issues, registering 111 persons, arranged a session on "The Psychology of Social Change" for Thursday morning in collaboration with the Program Committee of the American Psychological Association. Following the Annual Business Meeting on Wednesday, Edward C. Tolman delivered the Presidential Address on the topic "Psychological Man," a revision of the announced title. The Society also sponsored round tables on "The Psychology of War" and "Conforming Behavior Situations, Regimentation, and Effect of Type of Organization Upon the Individual." Floyd H. Allport was elected Chairman for 1940–1941, and Gordon Allport, Leonard Doob, E. R. Hilgard, and Gardner Murphy were elected as new members of the Council for 1940–1942.

Transactions of the Annual Business Meeting

Due notice having been given, the Annual Business Meeting of the American Psychological Association, Inc., was held on September 5, 1940, in Room 121, Liberal Arts Building, at Pennsylvania State College. A number far in excess of the necessary quorum being present, the meeting was called to order at 8:30 P.M. by President Leonard Carmichael.

Upon motion duly made and seconded it was voted that the minutes of the Forty-seventh Annual Meeting as held at Stanford University as part of the joint meeting with the University of California be approved as printed in the November, 1939, issue of the *Psychological Bulletin*.

The Secretary distributed mimeographed material covering Announcements and Recommendations of Council to serve as the agenda for the meeting. The Announcements were distributed as a matter of information and commented upon briefly by the Secretary.

The assembly stood in silent tribute as the Secretary read the names of the following 7 Members and 4 Associates who had died: Members—George F. Arps, September 16, 1939; William F. Book, May 22, 1940; F. B. Brandt, September 1, 1939; Karl Duncker, February 23, 1940; Rose S. Hardwick, December 2, 1939; Leta S. Hollingworth, November 27, 1939; and Margaret F. Washburn, October 29, 1939. Associates—Charles M. Davidson, April 5, 1939; Louis W. Keeler, November 5, 1939; Ryah B. Reisley, March 14, 1940; and Richard J. Van Tassel, August 30, 1940.

The Secretary announced the resignation of the following 4 Members: Frances I. Gaw, J. Victor Haberman, David Spence Hill, and Daniel E. Phillips.

The Secretary announced the resignation of the following 32 Associates: Louise Baker, Lillian Batlin, Frank A. Beach, II, Fred Sturges Beers, Orville J. Borchers, Paul Buttenwieser, Edmund Burke Delabarre, Jr., Gertrude P. Driscoll, Virginia Zerilli Ehrlich, William Feinbloom, Charles Frederick Glass, David Grauer, Mary Woodhull Haller, James Hargan, Josephine Goepp Herrick, S. Daniel House, Dwight J. Ingle, David Kaplun, Donald R. Mallett, Charles W. Mason, Elia Y. Melekian, Inez M. Neterer, Mabel F. Nichols, Stanley D. Noble, Martha Pollock, Kenneth H. Rogers, Robert G. Ruhl, Richard L. Schanck, Floyd B. Shannon, Ellis Spear, Ammon Swope, and Hazel Byrdell Thrush.

The Secretary announced that the following 2 Members have applied for and have received the status of Life Member: Thaddeus L. Bolton and Rose S. Hardwick.

The Secretary announced that the Council of Directors unanimously approved the actions of the President in making the following appointments:

Samuel W. Fernberger, of the University of Pennsylvania, to act as a representative of the American Psychological Association at the Forty-fourth Annual Meeting of the American Academy of Political and Social Science on April 12 and 13, 1940.

Ernest R. Hilgard, of Stanford University, to act as a representative of the American Psychological Association at the program in recognition of the occupancy of the new laboratory building by the Department of Psychology of the University of California at Los Angeles on June 13, 1940.

L. L. Thurstone, of the University of Chicago, to act as a representative of the American Psychological Association at the meetings of the Social Science Research Division of the University of Chicago on December 1 and 2, 1939.

In conformity with the vote at the 1939 meeting the Forty-ninth Annual Meeting of the American Psychological Association will be

held on the campus of Northwestern University on Wednesday, Thursday, Friday, and Saturday, September 3, 4, 5, and 6, 1941. A. R. Gilliland is the local member of the Executive Committee.

The Secretary announced that the following persons were selected by the Chairman, Edmund S. Conklin, and approved by Council as members on the Committee on Personnel, Promotions, and Public Relations: Gordon W. Allport, Barbara S. Burks, Henry E. Garrett, and B. F. Skinner.

The Secretary announced the interim appointment by President Carmichael of an Emergency Committee of the Council with the following members: Walter R. Miles, Chairman, Madison Bentley, W. V. Bingham, Leonard Carmichael (ex officio), H. E. Garrett, Walter S. Hunter, John G. Jenkins, Herbert S. Langfeld, R. A. McFarland, L. J. O'Rourke, Donald J. Paterson, A. T. Poffenberger, C. L. Shartle, and Robert M. Yerkes. Council further voted to designate the Committee as a joint one with the American Association for Applied Psychology with H. B. English as an ex-officio member.

The Secretary announced that the fourth joint meeting of the Council of Directors and Board of Editors was held on Tuesday, September 3, at which time reports on editorial and business policies were discussed.

The Secretary announced that Herbert S. Langfeld was re-elected as Editor of the *Psychological Review* by the Electoral Board as prescribed in the Constitution.

The Secretary announced the approval by Council of an interim allotment of $50 for the work of the Committee on the Preparation of Examination Questions in Psychology.

The Secretary announced the approval by Council of the distribution of mimeographed letters from Walter R. Miles and W. V. Bingham, of the Emergency Committee, to Members of the Association and heads of departments of psychology.

The Secretary announced the approval by Council of payment by the Association for the cost up to $100 of moving the office of Business Manager and Treasurer to Evanston. The official address after September 15, 1940, will be Northwestern University, Evanston, Illinois.

The Secretary announced that the Council of Directors has approved resolutions designating the Huntington National Bank of Columbus, Ohio, the Security First National Bank of Los Angeles, California, and the State Bank and Trust Company of Evanston, Illinois, as depositories for funds of the Association.

In the absence of Gordon W. Allport, Chairman, Edward C. Tolman announced the election of the following officers by mail ballot:

President for 1940–1941: Herbert Woodrow, University of Illinois.

Directors for 1940–1943: Edwin R. Guthrie, University of Washington; and Joy Paul Guilford, University of Southern California.

Nominees for appointment to the Division of Anthropology and Psychology of the National Research Council: Joy Paul Guilford, University of Southern California; Harold Ellis Jones, University of California; and Norman R. F. Maier, University of Michigan.

Representative on the Social Science Research Council: A. T. Poffenberger, Columbia University.

Following the Announcements the President took up in order the items on the mimeographed list of Recommendations from the Council of Directors. These were presented as motions already made and seconded and open for discussion. Wherever possible the chairmen of committees or representatives were called upon to read or comment on reports and recommendations.

The Association voted to elect Curt E. Berger directly to Membership in the Association and to transfer the 31 Associates named below to the status of Member:

1. Anderson, Edward Eric
2. Baker, Kenneth H.
3. Barker, Roger G.
4. Castner, Burton Menaugh
5. Chou, Siegen
6. Cowles, John Todd
7. Crutchfield, Richard S.
8. Darley, John Gordon
9. Elder, James Harlan
10. Erickson, Milton Hyland
11. Graham, James Larimour
12. Hattwick, LaBerta A.
13. Herrington, Lovic Pierce
14. Hertz, Marguerite R.
15. Kelly, Everett Lowell
16. Knower, Franklin H.
17. Lane, Helen Schick
18. Livesay, Thayne Miller
19. McCulloch, Thomas Logan
20. Middleton, Warren C.
21. Mitrano, Anthony J.
22. Porter, James Melville, Jr.
23. Rickers-Ovsiankina, Maria
24. Scofield, Carleton F.
25. Shipley, Walter C.
26. Sloan, Louise L.
27. Stockel, Minnie L.
28. Sumner, Francis Cecil
29. Whitely, Paul LeRoy
30. Wickens, Delos D.
31. Zener, Karl Edward

The Association further voted to elect as Associates the 263 persons whose names appear below:

1. Adams, Michael
2. Altus, William D.
3. Arnold, Donald Cutler
4. Balinsky, Benjamin
5. Beaver, Alma Perry
6. Bellak, Leopold
7. Belleau, Wilfrid Emmanuel
8. Berg, Irwin August
9. Berg, Lloyd Wesley
10. Berkeley, Austin West

11. Bernstone, Arthur Herbert
12. Billings, Elizabeth Louise
13. Birdsall, Lynnette Louise
14. Birmingham, Marion H.
15. Blake, John Ammen
16. Boesel, Florence Fitzgerald
17. Boguslavsky, George William
18. Boring, Frank Henry
19. Bradford, Leland Powers
20. Brayfield, Arthur H.
21. Brewer, Joseph E.
22. Bridges, Claude Frier
23. Bronfenbrenner, Urie
24. Brooks, Richard Boynton
25. Brown, Forrest Dumont
26. Brundage, Everett G.
27. Brundage, Geraldine Babler
28. Brush, George Robert, Jr.
29. Brye, Edvin
30. Bucklew, John, Jr.
31. Burch, Lester Louis
32. Caldwell, John J., Jr.
33. Canady, Herman G.
34. Carp, Abraham
35. Carpenter, Lewis Gibbs, Jr.
36. Carroll, Clara
37. Carter, Launor F.
38. Carter, Margaret Isabelle
39. Cass, William Avery
40. Chase, Genevieve
41. Chase, Jane Mustard
42. Close, Ruth Lucretia
43. Coblentz, Irving
44. Collins, Elizabeth Mary
45. Cooper, Joseph B.
46. Covner, Bernard Jerome
47. Cox, Grace Belden
48. Crissey, Orlo L.
49. Crook, Guy Hamilton, Jr.
50. Crowder, Ruth Russell
51. Crowninshield, Vincent Franklin
52. Curtis, Henry S., Jr.
53. Daniel, William John
54. Davenport, R. Newton
55. DeBow, Jeanne Griffiths
56. DeForest, Ruth
57. de Weerdt, Esther H.
58. Diehl, Harold T.
59. Dill, Helen Chute
60. Douglass, Harl R.
61. Dudek, Edmund Emil
62. Edwards, Marcia
63. Egan, James P.
64. Eggleston, Sister Mary Frederick, C.S.C.
65. Eitzen, David D.
66. Engle, Thelburn LaRoy
67. Erdelyi, Michael
68. Farberow, Norman Louis
69. Fischer, Robert Paul
70. Fisher, Burton Reuben
71. Fiske, Donald Winslow
72. Freeman, Ellis
73. French, John Winslow
74. Friedman, Seymour Thomas
75. Froehlich, Clifford Payo
76. Fromme, Allan
77. Garfield, Sol Louis
78. Garrett, James Francis
79. Gaudet, Hazel Peterson
80. Gilbert, Mariam Elizabeth
81. Glaser, Nathan M.
82. Glockler, Margaret Ellen
83. Goldfarb, William
84. Goldman, Meyer Lipman
85. Goldstein, Jean Marlyn
86. Goodman, Charles Hertzel
87. Gottschalk, Jerome Andrew
88. Gottsdanker, Robert M.
89. Gregory, Marianne McNeill
90. Griffin, Charles H.
91. Gutteridge, Mary Valentine
92. Haggard, Ernest Alexander
93. Hallow, William Charles
94. Hardtke, Eldred Frederick
95. Harney, Joseph William Thomas
96. Harris, John Donald
97. Hassan, Dorothea D.
98. Heathers, Louise Bussard
99. Heilman, Ann Elizabeth
100. Helgerson, Evelyn Fern
101. Hellman, Leon I.
102. Hellmer, Leo Aloysius
103. Henry, William Earl
104. Hertzler, Silas
105. Hind, Myrtle Lucile
106. Hirning, Jacob Louis
107. Hirschberg, Grace
108. Hites, Laird Thomas
109. Hoagland, Pearl
110. Hobbs, Nicholas
111. Holt, Robert Rutherford
112. Hopkins, Pryns
113. Horelick, Reuben S.
114. Horowitz, Bernard
115. Howard, Allen H.
116. Humphreys, Herbert Haynes
117. Hunsicker, Albert L.
118. Hunter, William Algeo
119. Hunter-Sicha, Mary
120. Hutchins, Lehman Cates
121. Jacob, Joseph Simeon
122. Janus, Sidney
123. Johnson, Donald McEwen
124. Kaplon, Martin David
125. Katzell, Raymond A.
126. Kavruck, Samuel
127. Keachie, Edward Chester
128. Keesler, Frances Jeanette
129. Kehoe, John Aloysius
130. Kendall, William Eugene
131. Kershner, Alan Motter

132. Kientzle, Mary Josephine
133. Kilmer, Elmer Kinsey
134. Klee, James B.
135. Klein, George Stuart
136. Lawrence, James F.
137. Lawshe, Charles Hubert, Jr.
138. Lee, Dorris May
139. Leetch, George Norman Pierce
140. Leiter, Russell Graydon
141. Libby, James Edward Paget
142. Lichte, William Heil
143. Licklider, Joseph Carl Robnett
144. Loeb, Nora
145. Lovell, George Doss
146. Lynch, James Matthew
147. MacCall, Sylvia Hazelton
148. MacDonald, Jean Martha
149. Macvaugh, Gilbert S.
150. Mailloux, Noel
151. Mandiberg, Myrtle
152. Marquit, Syvil
153. Martin, Anna Y.
154. Martin, Richard F.
155. Marx, Edmund P.
156. McCandless, Boyd Rowden
157. McCollom, Ivan N.
158. McConnell, Thomas Raymond
159. McCurdy, Harold Grier
160. Meyer, Herbert Irving
161. Millard, Kenneth Albert
162. Miller, Doris Reed
163. Miller, Frederick William
164. Miller, Richard Bateman
165. Morford, Samuel Denton
166. Morris, Woodrow Wilbert
167. Mount, Doris Edith
168. Moynihan, James F., S.J.
169. Mullen, Frances Andrews
170. Noble, Sister Mary Alfred, C.S.J.
171. Page, Howard Eastman
172. Page, Roger Bethel
173. Patchen, John Nicholas
174. Pathman, Julian H.
175. Patton, Robert Adams
176. Peden, Gwendolyn Winifred
177. Peixotto, Helen E.
178. Perin, C. Theodore
179. Perkins, Keith J.
180. Peterson, Bertha Marie
181. Pignatelli, Myrtle Luneau
182. Porter, Elias Hull, Jr.
183. Rapaport, David
184. Redmond, Sylvie Livingston
185. Reese, Thomas Whelan
186. Rein, Bernard D.
187. Roens, Bert A.
188. Rogers, Spaulding
189. Roshal, Sol Meyer
190. Roth, Harold Frederick
191. Safier, Daniel Edwin
192. Sanford, Fillmore Hargrave
193. Schaeffer, Robert Lee
194. Schapiro, Jack M.
195. Schmehl, A. Caroline
196. Schnelle, Kenneth Edward
197. Schoenfeld, Nathan
198. Seeleman, Virginia G.
199. Seidman, Jerome Martin
200. Shaffer, G. Wilson
201. Shaklee, Alfred Barral
202. Shapiro, Lillian F.
203. Shaw, Franklin Julius
204. Shaw, William A.
205. Sheffield, Frederick Duane
206. Sheffield, Virginia Fairfax
207. Sheldon, William H.
208. Shepard, Eugene Louis
209. Shepherd, Jane Alben
210. Shimkin, Demitri Boris
211. Shuder, Harry Andrew
212. Shugerman, Estelle Edna
213. Shurrager, Phil Sheridan
214. Simmons, Rachel McKnight
215. Skeath, James Milton
216. Sleicher, Carol D.
217. Smart, Mollie Stevens
218. Smith, Henry Clay
219. Smith, Mahlon Brewster
220. Sones, A. Merlin
221. Stafford, John William
222. Stainbrook, Edward John
223. Stanton, Joseph Ormonde
224. Stebbins, Alice Louise
225. Stone, Irving R.
226. Stone, Lewis Gordon
227. Stone, Mayer Baruch
228. Stuart, Charles Edward
229. Surgent, Louis V.
230. Swenson, Walter J.
231. Taylor, Alice Eleanor
232. Taylor, Donald Wayne
233. Thomson, Kenneth Francis
234. Tomkins, Silvan Samuel
235. Topper, Marguerite Ekdahl
236. Torrance, Hugh Kirk
237. True, Agnes Ann
238. Twining, Paul Ernest
239. Udow, Alfred Bernard
240. Ullman, Charles Alexander
241. Van Dusen, Albert Clarence
242. VanNewkirk, William C.
243. von Koch, Sigfrid F. R.
244. Walker, Edward Lewis
245. Wallace, Ramona
246. Wantman, Morey J.
247. Warren, Arthur Bertrand
248. Watkins, John Goodrich
249. Watts, Frederick Payne
250. Webb, Marvin William
251. Weil, Hermann
252. Weinstein, Benjamin
253. Welch, James C.

254. West, Wilbur Dickson
255. Whitman, Esther Christina
256. Wightwick, M. Irene
257. Williams, Olive Marie
258. Williams, Roger Kenton
259. Wolff, Werner
260. Wright, Henry Wilkes
261. Wright, James H.
262. Xoomsai, Tooi
263. Zawadzki, Bohdan

The Association voted that the report of the Program Committee be accepted with thanks and ordered printed in the Proceedings. The Association further voted that the Committee during the following year engage in a study of the wishes of Associates and Members concerning the program and appropriated $50 for this purpose. The Committee was continued with Elmer Culler as Chairman, and Forrest A. Kingsbury and the Secretary as members. (See Reports.)

The Association voted that the report of the Committee on Precautions in Animal Experimentation, H. F. Harlow, Chairman, be accepted with thanks, ordered printed in the Proceedings, and that W. N. Kellogg, of the University of Indiana, be appointed as a member of the Committee for the term 1940–1943. (See Reports.)

The Association voted that the report of the Committee on Motion Pictures and Sound Recording Devices in Instruction of Psychology, Willard L. Valentine, Chairman, be accepted with thanks and ordered printed in the Proceedings, and that the Committee be continued with the addition of K. H. Baker and with William A. Hunt as Chairman. (See Reports.)

The Association voted that the Joint Committee of the American Psychological Association and the Psychologists' League be discontinued in view of the organization of the Committee on Personnel, Promotion, and Public Relations.

The Association voted that the Committee on the Preparation of Examination Questions in Psychology, Alvin C. Eurich, Chairman, be continued and that the interim appropriation of $50 for initial work be made available as needed.

The Association voted that the report of the Advisory Committee on the *Psychological Index*, A. T. Poffenberger, Chairman, be accepted with thanks, ordered printed in the Proceedings, and that the Committee be continued with its present membership. (See Reports.)

The Association voted that the report of the Committee on Displaced Foreign Psychologists, Barbara S. Burks, Chairman, be accepted with thanks and ordered printed in the Proceedings. The Association further voted that the Committee on Displaced Foreign Psychologists be constituted for the coming year as a sub-committee of the Committee on Personnel, Promotion, and Public Relations and

be continued with its present membership, and appropriated $200 for its work. (See Reports.)

The Association voted the continuation of the Committee on Investments with its present membership. The Committee reports that the surplus funds of the Association earned $737.88 during the past year.

The Association voted that the report of the Committee on Press Relations, B. F. Skinner, Chairman, be accepted with thanks, that the Committee be discharged, its advisory functions transferred to the Committee on Personnel, Promotion, and Public Relations, and its active work delegated to Press Committees set up by local committees for the Annual Meeting.

The Association voted that the report of the Committee on Scientific and Professional Ethics, R. S. Woodworth, Chairman, be accepted with thanks and ordered printed in the Proceedings, with the exception of the last two paragraphs, which have been edited for further actions by the Association. (See Reports.) The Association further voted that the temporary Committee be discharged as having fulfilled its functions.

The Association voted the following addition to the Bylaws as Article VII, Section 5, existing Section 5 to be retained and renumbered:

"The Committee on Scientific and Professional Ethics shall consist of four Members chosen from different parts of the country for staggered terms of four years. Appointment to this Committee shall be by vote of the Annual Meeting on nomination by the Council of Directors. It shall be the duty of this Committee to receive and investigate complaints of unethical conduct of Members and Associates; to endeavor to settle cases privately; to report annually to the Council of Directors on the types of cases investigated, with specific mention of difficult or recalcitrant cases; to recommend to the Council disciplinary action to be taken by the Association when in the Committee's judgment such action is justified and desirable; and to formulate from time to time rules or principles of ethics for adoption by the Association."

The Association elected the following members to the Committee on Scientific and Professional Ethics to serve terms as indicated: A. T. Poffenberger, Chairman, 4 years; J. F. Dashiell, 3 years; E. C. Tolman, 2 years; and H. A. Carr, 1 year.

The Association voted that the last sentence of Article I, Section 3, of the Constitution be deleted. The sentence reads:

"An Associateship may be terminated at any time by a majority vote of the Members at any Annual Meeting upon recommendation of the Council of Directors after investigation."

It further recommends the addition of a Section 11 to Article I, to read as follows:

"Any Member or Associate may be expelled for cause by an affirmative vote of two-thirds of the Members present at an Annual Meeting. Such vote shall be taken only upon recommendation of the Standing Committee on Scientific and Professional Ethics, which shall have given the Member or Associate opportunity to appear before the Committee and to answer charges against him; and after review and approval of the Committees' recommendations by the Council of Directors."

The Association voted that the report of the Committee on the Constitution, J. F. Dashiell, Chairman, be accepted with thanks, ordered printed in the Proceedings, and that the Committee be continued with an appropriation of $60 for studying the opinions of Members and Associates. (See Reports.)

The Association voted that to Article VII of the Constitution a Section 6 be added to read:

"All committee members and appointive delegates of the Association shall ordinarily be full Members; Associates, however, becoming eligible for election or appointment when no Member is available or an Associate appears to be exceptionally well qualified."

The Association voted that the report of the Committee on Calendar Reform, H. B. English, Chairman, be accepted with thanks, ordered printed in the Proceedings, and the Committee discharged. (See Reports.)

The Association adopted the following resolution:

"The American Psychological Association at its 1940 Annual Meeting joins with other scientific societies in expressing approval of the World Calendar; it urges the national government to take leadership at appropriate time to secure world-wide adoption."

L. J. O'Rourke, Chairman of the Committee on Psychology and the Public Service, presented an oral report on the placement of psychologists in the government service. The Association voted that the Committee be continued with its present membership with the addition of W. V. Bingham.

The Association voted that the progress report of the Committee on Personnel, Promotion, and Public Relations, E. S. Conklin, Chairman, be accepted with thanks and that the Committee be continued with its present membership. A supplementary report read at the meeting advocated the creation of a placement service and the employment of a secretary for full time.

The Association voted the creation of a Committee on Extension

of Functions of the Secretary's Office, consisting of the incoming President as Chairman and the Treasurer and the Secretary as members, to study the supplementary recommendations of the Committee on Personnel, Promotion, and Public Relations from the point of view of policy, relations to affiliated societies, and financial possibilities, and to present a report to Council at the 1941 meeting.

In view of the possibility of taking constructive steps in the interim on the portion of the report dealing with the development of an analytical central depository of information, an appropriation of $300 was voted by the Association to the Secretary's office for the development of a plan in coöperation with the National Roster of Scientific and Specialized Personnel, of which Leonard Carmichael is Director.

The Association voted that the reports of its representatives to the American Association for the Advancement of Science be accepted with thanks and ordered printed in the Proceedings, and re-elected Walter R. Miles and John A. McGeoch as representatives. (See Reports.)

The Association voted the acceptance of the report of its representative, H. B. English, on the Council of Human Relations of the American Association for the Advancement of Science, and continued the representation.

The Association voted that the report of the Association's member in the American Documentation Institute be accepted with thanks and ordered printed in the Proceedings, and that John E. Anderson be continued as representative. (See Reports.)

The Association re-elected William A. McCall as a representative of the American Psychological Association to the American Standards Association.

The Association voted that the report of the delegates to the Inter-Society Color Council be accepted with thanks and ordered printed in the Proceedings, and that affiliation with the Inter-Society Color Council for 1940–1941 be continued. The Association further voted that the present delegation be continued with its Chairman, Forrest Lee Dimmick. (See Reports.)

The Association voted that the report of Henry E. Garrett, a representative of the American Psychological Association to the National Research Council, be accepted with thanks and ordered printed in the Proceedings. (See Reports.)

The Association voted that John G. Jenkins be continued as representative on the New York Management Council, which is

temporarily inactive but maintains a skeleton organization for use as needed.

The Association voted that the report of the senior representative, A. T. Poffenberger, to the Social Science Research Council be accepted with thanks and ordered printed in the Proceedings. (See Reports.)

The Association voted to create a Committee on Observance of the Fiftieth Anniversary of the American Psychological Association and the Centennial of William James. The function of this Committee is to plan for a suitable historical celebration at the Harvard meeting on September 2–5, 1942. The Association voted to appoint Edwin G. Boring as Chairman, S. W. Fernberger as historian, and J. G. Beebe-Center as an added member.

The Association voted to accept the report of the Treasurer and Business Manager of Publications, W. L. Valentine, for the year ending December 31, 1939, and ordered it printed in the Proceedings. The report is supplemented by a report of the auditors. (See Reports.) The Business Manager further announced that the club rate of $10.00 for Members and Associates for the Association's publications had received such a generous response that it was possible to offer an $8.00 club rate for 1941.

The Association voted that the Treasurer's budget for 1941 be approved and ordered printed in the Proceedings. (See Reports.)

The Association voted that J. P. Guilford be appointed a committee of one to investigate plans, costs, and probable interest in an *Annual Review* of the development of psychology.

The Association voted the nomination of Walter R. Miles as the Association's representative to the newly created Emergency Committee in Psychology of the National Research Council, which is to include representatives of the various psychological societies. The Association further voted that, in view of the danger of confusion, Members and Associates, when possible, clear suggestions for emergency activity through the Association's representative on the Committee.

Walter R. Miles was called upon for a report of the joint Emergency Committee of the Council of the American Psychological Association and Executive Committee of the A.A.A.P. In view of the importance of its activities the Association voted to constitute it as a Committee of the Association, accept and print its report, and discharge it with thanks, since its functions are to be continued in the new Committee of the National Research Council. (See Reports.)

Upon motion by Myrtle McGraw, duly seconded, the Association voted to create a Committee on Refugee Children to be appointed by the incoming President.

The Association re-elected Willard C. Olson, of the University of Michigan, as Secretary of the Association for a three-year term.

Upon motion by Professor H. A. Carr, duly seconded, the Association adopted the following resolution of thanks:

Be it resolved that the American Psychological Association, assembled at the Forty-eighth Annual Meeting, express its thanks to President Ralph Dorn Hetzel, of the Pennsylvania State College, to Professor Bruce V. Moore in charge of local arrangements, and to psychologists and other officers, members, and graduate students of the College for their cordial hospitality and for the high quality of the arrangements made for the meetings of the Association.

The meeting adjourned at 11:30 P.M.

REPORTS

REPORT OF THE PROGRAM COMMITTEE

To the Council of Directors and Members of the American Psychological Association:

The "Call for Papers," after due revision, was issued by the Program Committee at the usual time; in reply, 228 abstracts were received directly from the membership. The corresponding figure for the Columbus meeting in 1938 was 213 and for the California meeting in 1939, 131. In addition, some approved abstracts were received from the Program Committees of affiliated societies: 9 from the Psychometric Society, 7 from the Society for the Psychological Study of Social Issues, and 16 from the American Association for Applied Psychology. The current Program was, therefore, drawn from a total of 260 abstracts, the largest number in the history of this Association. The physical meeting of the Committee for arranging the Program was held on June 2, 1940, at which all members were present; in addition, Professor C. M. Louttit attended as representative of the A.A.A.P. After an arduous session, 190 abstracts, distributed in 24 section-meetings, were incorporated in the Program. This compares with 178 abstracts in 1938 and 142 in 1939. In order to provide the necessary time for so large a number of papers, it was decided to run four sessions concurrently on Wednesday, Thursday, and Friday instead of three as heretofore. Nine films were listed in a program on "Research and Instructional Films" for Wednesday evening, September 4. Round tables were scheduled on the following topics: "The Design of Experi-

ments in Psychology," "Remedial Instruction," "Conforming Behavior Situations, Regimentation, and Effect of Type of Organization Upon the Individual (Methods of Measurement and Analysis)," "Standardization of Measures of Electrical Skin Resistance," and "The Psychology of War."

The current Program follows the procedure adopted last year of printing a Time Schedule just prior to the abstracts. Now that a fixed period (15 to 20 minutes) is reserved for each paper in a given session, the Committee believes that our members appreciate the condensed Time Table, listing on a single page all concurrent programs and the time at which each paper may be expected to begin and to end. Inasmuch as the schedule is of value only if properly observed, the Committee urges all session-chairmen to adhere carefully to the Time Table.

A few matters of policy may be mentioned: (1) In so far as they met technical requirements, virtually all abstracts from Members of the Association and as many as could reasonably be accommodated from Associates were accepted. The Committee held that authorship by a Member of the Association constitutes presumptive evidence that an abstract is worthy of acceptance. A Member's privilege of addressing the Association at its annual meeting is not, in our opinion, a favor to be granted or withheld by the Program Committee; but is, instead, a right conferred by the Association itself in the act of election to membership. This right is subject only to the equal rights of other Members and to the practical requirements of keeping the length of our program within acceptable limits. In the case of Associates, whose election to this Association presupposes little more than a professional interest in Psychology, it is clear that the latitude of acceptance for abstracts must be restricted to those which, after due consideration by the Committee, seem most suitable for the Program. In any case, however, it should be noted that rejection of an abstract need not imply lack of merit. In a number of cases, there was no appropriate session for a particular abstract or the appropriate session was already overloaded. (2) The opinion is sometimes heard that the Program Committee should be more "hard-boiled" in rejecting abstracts, thus shortening the Program and, by implication, raising its quality. With that policy your present Committee is in only partial agreement. We concede that minor abstracts should be excluded, but wish to emphasize that evaluation of abstracts is often quite difficult. Unless the abstract is definitely unworthy of inclusion, we feel that the members should be given the right of hearing the paper if they so desire. By scheduling abstracts in a time table, each person can decide for himself whether or not he cares to hear a given report. Furthermore, since the Association is growing year by year, we must expect the Program to lengthen proportionately. The Committee does, however, recommend that our Association consider the advisability of reducing the time limits for individual papers from the present 15 minutes to 12 and from 10 minutes to 8. This action would be in line with the policy of other scientific societies and would reduce by 20% the over-all length of each session.

The Committee voted to instruct the Secretary to include in all letters

of acceptance a statement suggesting that a complete copy of the paper be sent to Professor E. B. van Ormer at State College for use of press representatives.

Respectfully submitted,
FORREST A. KINGSBURY
WILLARD C. OLSON
E. A. CULLER, *Chairman*

REPORT OF THE COMMITTEE ON PRECAUTIONS IN ANIMAL EXPERIMENTATION

To the Council of Directors and Members of the American Psychological Association:

Dr. William C. Woodward, Director of Legal Medicine and Legislation of the American Medical Association, has again acted this year in notifying the Committee concerning any legislation designed to limit the use of animals in scientific research. During the last year only one such bill has come to the attention of the Committee, a New Jersey bill designed to prohibit the use for any purposes of vivisection of stray cats and dogs which might be encountered. Letters concerning this bill were sent to animal psychologists in the state of New Jersey.

Few requests have been received this last year for the printed lists of rules and precautions concerning animal experimentation, and the Committee would like to call attention to all interested psychologists that these are still available and will be sent to any laboratory upon request.

Respectfully submitted,
KARL F. MUENZINGER
NORMAN R. F. MAIER
H. F. HARLOW, *Chairman*

REPORT OF THE COMMITTEE ON MOTION PICTURES AND SOUND RECORDING DEVICES IN INSTRUCTION OF PSYCHOLOGY

To the Council of Directors and Members of the American Psychological Association:

During the year the Committee has continued to serve as a clearing-house for information concerning films and filming. Through the generosity of the Committee on Scientific Aids to Learning of the National Research Council we were also able to distribute a limited number of their report, "Broadcast Receivers," which was an evaluation and comparison of broadcast receivers for school use. Those persons who missed this valuable report may have a copy by writing to Irvin Stewart at 41 East 42nd Street, New York City.

Even more valuable to most of us is a forthcoming report of the same Committee. It will be a comparison of various 16-mm. motion picture projectors. The technical data for this report have been collected by the Bureau of Standards under a grant from the Committee on Scientific Aids to Learning. It is expected that the report will appear within a month or two, and it also is available to teachers upon application to Irvin Stewart.

Attention is again called to the article on motion picture production which appeared in the January number of the *Bulletin*. Observance of some of the simple procedures outlined in this report will materially increase the effectiveness of films shown at the annual meeting. Producers should also consider carefully the effectiveness of the motion picture medium itself for their particular purpose. When no action is involved, effective presentation can be achieved better and more economically by using well-prepared charts or lantern slides.

Respectfully submitted,

LEONARD CARMICHAEL
FORREST L. DIMMICK
EDGAR A. DOLL
WILLIAM A. HUNT
MILTON METFESSEL
WALTER R. MILES
W. L. VALENTINE, *Chairman*

REPORT OF THE ADVISORY COMMITTEE ON THE *Psychological Index*

To the Council of Directors and Members of the American Psychological Association:

The past year has been a difficult and trying one for the Index Project. Reduction of W.P.A. appropriations and changes in regulations caused the loss of two of our three supervisors and a large proportion of our trained abstractors and indexers. In addition there has been a tendency toward demoralization because of feelings of insecurity among those retained. These conditions are inherent in the W.P.A. setup. However, the work has continued, though at a reduced speed. To June 30, about 74,000 articles (70%) had been abstracted, and 49,000 indexed. About three-fifths of the latter have been finally edited, and somewhat fewer have been typed and filed. Continuance seems assured till October 1.

The Committee acknowledges the helpful assistance of D. Madison Bentley and Miss Betty Sandlas in dealing with many obscure references.

The Committee requests its continuance for another year in order that it may be available for consultation when problems arise.

Respectfully submitted,

K. M. DALLENBACH
C. M. LOUTTIT
R. R. WILLOUGHBY
A. T. POFFENBERGER, *Chairman*

REPORT OF THE COMMITTEE ON DISPLACED FOREIGN PSYCHOLOGISTS

To the Council of Directors and Members of the American Psychological Association:

The program initiated during the year 1938–1939 has been continued and developed. Members of the Committee have engaged in the following activities designed to conserve for psychology the talents of émigré psychologists:

(1) Close coöperation has been maintained with various agencies for refugee aid. These agencies have continued to refer individuals to our Committee for advice, and we in turn have referred cases to the agencies for assistance and special services.

(2) A central repository has been maintained for curricula vitae of displaced psychologists and scholars in related fields. The curricula vitae are available upon the request of coöperating individuals and agencies, and have been copied and transmitted in fairly large numbers during the course of the year.

By June 30, 1940, the Committee was in touch with 269 displaced scholars distributed as follows:

	Psychology	Philosophy*	Medicine (psychol. background)	Other Cases	Total
In U. S.....	85	11	18	20	134
Approx. no. entering June, 1939–June, 1940	19	3	1	7	30**
Not in U. S.....	63	22	30	20	135
Total	148	33	48	40	269

* Since the establishment of a Committee on Exiled Scholars by the American Philosophical Association, few philosophers have been referred to the D.F.P. Committee.

** It may be recalled that from the data available in last year's report, we were able to predict that about 25 new émigré psychologists would reach this country during the course of a year. The number entering was, in fact, approximately 20.

(3) Recent arrivals have been interviewed by one or more members of the Committee and referred to agencies or to professional colleagues who would be in position to advise or assist them further. Contact has been maintained with "old cases" still in need of advice; also to our great satisfaction, with those who have become professionally re-established and are no longer "cases." Correspondence has been continued with displaced psychologists still abroad but awaiting an opportunity to emigrate.

(4) Assistance other than that directly concerned with resettlement has been rendered as during the previous year, for example: encouragement to attend and give papers at psychological meetings, securing university library privileges, advising and assisting with research publications, as well as with problems of personal adjustment. One of the most successful activities was a seminar on American psychology held weekly during the spring months by Dr. Ira Wile. The Committee is deeply indebted to Dr. Wile for generously proposing and carrying through this seminar, which was well attended and much appreciated by displaced psychologists in the New York region. A similar seminar will be conducted in the Boston area in the fall of this year.

(5) Placements in which the Committee has coöperated have continued to be largely of the "training" type, *i.e.* internships or volunteer

posts in schools, state institutions, clinics, or hospitals, and temporary research and teaching positions under guidance. It has been necessary to work within a complicated framework which includes such factors as: (a) the perplexities encountered by a majority of professional émigrés in reorienting themselves in the American culture; (b) the difficulty of gauging the talents of psychologists with foreign background until they have obtained some experience under American conditions; (c) the unemployment conditions prevailing among Americans in professional fields, including psychology. These conditions have led us from the first to support a general policy of cultivating new opportunities in psychology, rather than increasing competitive pressure through partiality toward refugees.

The employment status of the scholars now in the United States is represented to the best of our knowledge by the following figures:

Employed:	
In paid professional work *	48
On interne or volunteer or student basis	11
Outside of profession	6
Not employed	21
Present status unknown to us	48
	134

Placements Facilitated During Current Year by D.F.P. Committee	
Academic and research	11
Clinical internship or volunteer post or advanced study	3
Fields other than psychology	2
	16

* In a number of these cases the work is part-time, temporary, and poorly paid.

There follows a statement of funds received and disbursed during the course of the year June 30, 1939, to June 30, 1940:

Receipts		
American Psychological Association	$200.00	
Midwestern Psychological Association	25.00	
Southern Society for Philosophy and Psychology	25.00	
Western Psychological Association	25.00	
Lecture proceeds *	25.00	
Total Receipts		$300.00
Disbursements		
Secretarial assistance	$120.00	
Travel expenses	32.50	
Postage, stationery, supplies	54.36	
Telephone, telegrams, cables	33.35	
Mimeographing	.50	
Total Disbursements	$240.71	
Net Receipts		$59.29
Cash Balance at beginning of period		63.26
Cash Balance June 30, 1940		$122.55

* This item represents an honorarium received by a Committee member for a lecture on the problem of academic refugees in America.

Recommendations

(1) The Committee is highly gratified that the Council's recommendation of last year to set up a Committee on Personnel, Promotion, and Public Relations was adopted by the Association, and that Professor E. S. Conklin has accepted the chairmanship of the new Committee. It is recommended that the D.F.P. Committee be constituted for the coming year as a sub-committee of the Committee on Personnel, Promotion, and Public Relations.

(2) Certain geographical regions and certain fields of psychology (especially in applied psychology) are not represented in the present membership of the Committee. It is recommended that not less than three new appointments be added to remedy present lacks.

(3) The need for an executive secretary who possesses a sound reputation as a psychologist as well as an active and imaginative interest in the refugee problem is increasingly evident. It is not too calamitous to say that the position of scientific psychology throughout the world, excepting only in the Americas, is *in extremis*. Virtually the only way now open to us to fight for our professional integrity is to strengthen our efforts in behalf of psychologists who have managed to take refuge here from tyranny abroad.

It is urgently recommended that the Council consider ways and means of placing the work of this Committee, and perhaps of the more inclusive Committee on Personnel, Promotion, and Public Relations, on a more adequately paid basis, in order that their functions may be developed in a way that will make a more generous contribution to the advancement of psychology as a science.

Respectfully submitted,

GORDON W. ALLPORT
WILLIAM A. HUNT
D. B. KLEIN
GARDNER MURPHY
SAUL ROSENZWEIG
E. C. TOLMAN
MAX WERTHEIMER
BARBARA S. BURKS, *Chairman*

REPORT OF THE COMMITTEE ON SCIENTIFIC AND PROFESSIONAL ETHICS

To the Council of Directors and Members of the American Psychological Association:

This Committee was created in 1938 and continued at the Annual Meeting of 1939, being instructed "to consider the advisability of drafting an ethical code, the purpose of which would be to serve as a guide to Members and Associates."

Though the Committee was not empowered to receive and investigate complaints of unethical conduct, several such complaints have been referred to the Committee and have been handled privately and informally,

with apparently good results. In some cases the unethical conduct was thoughtless and was corrected as soon as this agency of the Association called it in question. In other cases there was something to be said in defense of the criticized conduct, but the Committee's intervention led to more serious consideration of the points at issue.

The experience so gained leads us to believe that a standing committee of the Association, empowered to consider complaints of unethical conduct, would justify its existence.

Our Committee does not regard itself as empowered to make any recommendations to the Council or to the Association on the specific cases referred to it.

Types of Questionable Conduct

Besides the cases referred to our Committee for its information, many other cases, new and old, have been called to our attention as suggestive of principles to be included in a code of scientific and professional ethics. These cases may be classified under several heads according to the relationships involved.

(1) Relations of the individual psychologist to the Association:

A, being an Associate, speaks or writes of himself publicly as a Member.

B, either a Member or an Associate, in advertising a psychological service which he is offering, refers to his connection with the Association as establishing his claim to be a scientific psychologist. In itself such conduct may not be objectionable to the Association. It certainly becomes objectionable if the individual makes greater claims for his service than can be justified in the present state of the science.

(2) Relations of the psychologist to his scientific colleagues:

C, in writing a textbook or constructing a test, fails to give due credit for material taken from published work of another psychologist—plagiarism, in a word.

D, in a scientific paper, fails to give due credit to a colleague who has borne some share of the work. The principle here is that the paper should indicate who is responsible for each essential part of the scientific work (see T. L. Kelley, *Scientific Method*, 1929, p. 80). In a case of joint authorship of a scientific book, also, the responsibility for each part of the book should be clearly indicated. Otherwise, for example, the responsibility for plagiarism cannot be limited to a single author.

(3) Relations of the psychologist to his students:

E, a professor, incorporates the work of his students in his own research papers without giving them personal mention.

F permits his students to publish work to which he has contributed without their indicating what part of the work is due to the professor. The principle here is the same as in the case of D just above.

(4) Relations of the psychological experimenter to his subjects: So far as animal subjects are concerned the ground is already covered by the Standing Committee on Precautions in Animal Experimentation. With regard to children and adult human subjects questions of ethics are suggested by cases like the following:

G, in an investigation of sex interests, asks intimate questions of young adults without considering whether any of these young people may be harmed by the interview.

H, in a research on honesty, employs a performance test which affords easy opportunities for dishonesty, without considering whether the effect on some children will be to make them more dishonest than before.

J, in a research on motivation or level of aspiration, grossly misinforms his subjects as to their standing in comparison with the average.

The principle suggested by those who criticize such procedures is that the welfare of the subjects should be considered. One clinical psychologist (F. L. Wells) has offered the opinion "that procedures with children based on experimental inducement to antisocial conduct, except as made competently and in good faith for the better adjustment of the children concerned, are contrary to mental hygiene and public policy."

(5) Relations of the psychologist to clients or other nonpsychologists who come to him for advice or for conducting investigations: For the most part the questions arising come within the scope of the A.A.A.P. rather than of the A.P.A., but two typical cases may be mentioned:

K, on receiving a letter from a self-styled psychologist who appears from the letter to be rather a charlatan, answers some of his questions and is surprised later to find his own name on the letterhead of the said self-styled psychologist, designated as a "scientific adviser."

L is employed by a commercial concern to conduct an investigation of some scientific as well as practical interest. Failing to secure a suitable contract in advance, he finds himself unable to publish his scientific findings or even to prevent the publication of misleading statements ostensibly based on his investigation.

(6) Relations to publicity agencies:

M allows himself to be interviewed by telephone and is quoted in the newspaper as authority for a misleading statement on a scientific matter.

N obtains newspaper publicity for certain new results which have not yet been presented for the criticism of his scientific colleagues. To his colleagues he appears overhasty, and he runs the risk of publicizing results that are later discredited.

O, by signing a public manifesto in effect represents himself as an authority on a question lying outside his special field of competence and lends the weight of his name to statements which are open to doubt.

P undertakes to serve as a scientific expert in a radio advertising campaign, but finds that he has very little authority and that he is represented by the manager as vouching for uncontrolled procedures and unscientific conclusions. No charge of unethical conduct is made against the psychologist in this case, but his experience, like that of several others cited, deserves to be analyzed and placed on record as a warning for other psychologists.

Recommendations

This Committee was not charged to prepare a code but to advise the Association whether a code should now be prepared. In our opinion any attempt by the Association to legislate a complete and rigid code would be premature at the present time.

We recommend, however, that the Association create a Standing Committee empowered to act for the Association in investigating complaints

of unethical conduct of Members and Associates. It should also consider cases in which a psychologist is placed in an unfortunate position, scientifically or professionally, in his dealings with persons outside the Association. Our idea is that the Committee could settle many cases privately and report difficult cases to the Council of Directors with recommendations. Certain rules of procedure would have to be worked out by the Committee and approved by the Council, and before any disciplinary action could be taken by the Association, suitable provision for it would need to be made in the Bylaws, presumably on the recommendation of the proposed Standing Committee. From time to time the Committee should formulate rules or principles suitable for inclusion in a code and submit them for adoption by the Association.

We offer for adoption by the Association an amendment to Article VII of the Bylaws, adding a new Section 5 to read as follows:

"The Committee on Scientific and Professional Ethics shall consist of four Members chosen from different parts of the country for staggered terms of four years. Appointment to this Committee shall be by vote of the Annual Meeting on nomination by the Council of Directors. It shall be the duty of this Committee to receive and investigate complaints of unethical conduct of Members and Associates; to endeavor to settle cases privately; to report annually to the Council of Directors on the types of cases investigated, with specific mention of difficult or recalcitrant cases; to recommend disciplinary action by the Association when in the Committee's judgment such action is justified and desirable; and to formulate from time to time rules or principles of ethics for adoption by the Association."

Respectfully submitted,
W. V. BINGHAM
E. A. BOTT
H. A. CARR
FRANKLIN FEARING
H. M. JOHNSON
T. L. KELLEY
D. G. MARQUIS
R. S. WOODWORTH, *Chairman*

REPORT OF THE COMMITTEE ON THE CONSTITUTION

To the Council of Directors and Members of the American Psychological Association:

The Chairman of the Committee on the Constitution begs permission to offer the following report of the Committee's activities since its creation in September, 1939.

In October the Chairman addressed a letter to the members attempting to formulate questions lying before the Committee and asking for opinions. The responses were abstracted and distributed to the members. Some measures were agreed upon in principle. They will be furnished below. Others pertaining especially to the status of Associates and Members of the A.P.A. clearly needed further canvassing.

Two members had independently suggested that those Associates holding the Ph.D. degree be circularized to learn their willingness to accept Membership automatically with the higher dues of $10, so that their responses might serve as an index of just how unfavorable they considered their status as Associates to be. The Treasurer and the Secretary of the Association took up the matter of postal expense, and the Council authorized budgeting $50 to cover, the Secretary further suggesting that the questionnaire might be sent from his office along with the Preliminary Announcement of the Annual Meeting. Meanwhile, opposition to the circularizing was voiced vigorously by one member of the Committee; and the Chairman felt disinclined to push a measure of so formal and public a nature until all members of the Committee had had abundant time to consider it thoroughly.

In February the Chairman wrote personal letters to 22 of the older active Members of the A.P.A. to determine whether there was among them any clear drift of opinion on the advisability of broadening the qualifications for Membership to facilitate the promotion of a larger number of Associates. Answers were received from 18. They revealed a slight majority in favor of retaining the status quo; but the variation in answers was instructive.

In May the Chairman decided that while not yet pressing the procedure of circularizing all Ph.D. Associates he might sample their attitudes by addressing personal requests for confidential replies to 50 of them selected somewhat at random. All but three have replied. Their answers show a definite majority who would accept Membership automatically if given; but some preferred to earn the Membership for some type of merit. A number were concerned over the $10 dues, several suggesting equalizing at $7 for both Members and Associates.

Some further correspondence on this question of the qualifications for Membership received from Committee members gives the Chairman hope that more substantial agreement within the Committee may be worked out, either in a physical meeting or by correspondence.

As specific proposals to the Council of Directors your Committee offers the following:

We recommend that to Article VII of the Constitution a Section 6 be added to read: "All committee members and appointive delegates of the Association shall ordinarily be full Members; Associates, however, becoming eligible for election or appointment when no Member is available or an Associate appears to be exceptionally well qualified." (This would take care of such cases as the naming of delegates to university celebrations, appointing local committees for annual meetings, etc.)

We recommend that this Committee be continued for one year.

We recommend that a sum not to exceed $60 be budgeted to this Committee to defray mailing expenses if and when the Committee decides to conduct a poll of the Associates holding the Ph.D. or equivalent. (This is an outside figure; and the Committee may find it possible to avail itself of the Secretary's offer to enclose its questionnaire with the Announcement of the Annual Meeting, with consequent savings.

We are not ready to make recommendation on any of the following items:

(1) Any change in method of nominating members of Council.

(2) Any change in method of counting nominating ballots (for all offices).

(3) Any change in the qualifications for election to full Membership in the Association.

Respectfully submitted,

LUTON ACKERSON
JOHN E. ANDERSON
S. W. FERNBERGER
R. B. MACLEOD
KARL F. MUENZINGER
BRONSON PRICE
DAEL WOLFLE
R. S. WOODWORTH
J. F. DASHIELL, *Chairman*

REPORT OF THE COMMITTEE ON CALENDAR REFORM

To the Council of Directors and Members of the American Psychological Association:

That our present calendar is but an awkward means for measuring time needs no elaboration. There have been very many efforts to arrive at rational emendations. Apparently no completely rational solution is possible. The so-called World Calendar, however, embodies a large number of highly useful changes and it has gained enough momentum to seem possible of adoption.

Under the World Calendar, year length is regulated as at present. It is divided into *equal* quarters of 91 days each, with an extra year-end day to care for the 365th day and another extra day at the end of June in leap years. The first month of each quarter is of 31 days, the next two of 30.

This calendar is perpetual; a given date always falls on the same day of the week. It is so simple that reference to printed calendars will seldom be necessary; one and the same calendar serves for all years. All months have the same number of working or school days; the extra day in the four months which have 31 days is always a Sunday. National and religious holidays (including Easter) can be stabilized; it is believed that most of them will be put on Monday or Friday to avoid interruption of the week.

Many business concerns have already adopted this or a similar calendar for accounting purposes; there are obvious advantages; but they find it most disadvantageous to be out of step with the civil calendar. The World Calendar would be of considerable advantage to educational administration. Quarters and semesters would be truly equalized; opening and closing dates, holidays, and examinations would be stabilized. The articu-

lation, to use a simple example, of the A.P.A. Annual Meeting with the opening of most colleges would be worked out more conveniently.

For all research which extends over considerable time intervals, the computation of those intervals would be greatly simplified and made more accurate. In child development research there are special advantages. Birth dates will be more correctly recorded and reported. Appointments for tests and examinations can more easily be made to conform to an exact interval or the computation of the interval simplified.

Aside from inertia, the chief objection comes from certain literalist religious bodies. The solar year is incommensurable with a seven-day week. To keep in step with the seasons, a perpetual calendar must interpolate a day outside the weekly cycle. This is objected to as violating the weekly Sabbath of divine institution. Most church bodies, however, find no insoluble difficulty here, and it is predicted that the scattered few who now think they do will find ways of accommodating themselves to an arrangement based on scientific fact. (The international date line causes a similar problem for those members of Sabbatarian faiths who cross it, but they manage it somehow.)

Your Committee finds no reason why the World Calendar should not be favored by psychologists, finds sound and fairly important grounds for approval. We recommend that the Council of Directors bring the following motion before the Association:

"The American Psychological Association at its 1940 Annual Meeting joins with other scientific societies in expressing approval of the World Calendar; it urges the national government to take leadership at appropriate time to secure world-wide adoption."

Respectfully submitted,
E. B. DELABARRE
H. B. ENGLISH, *Chairman*

REPORT OF THE REPRESENTATIVES TO THE COUNCIL OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

To the Council of Directors and Members of the American Psychological Association:

As representatives appointed by the Council of Directors of the American Psychological Association to the Council of the American Association for the Advancement of Science we wish to report that the relations between the two Associations continue to be cordial. The Columbus meeting of Section I (Psychology) was well attended. More than 50 papers were presented, and a symposium, organized by Ross A. McFarland, was held on "The Internal Environment and Behavior." The newly elected Vice-President of the Section is Karl M. Dallenbach, and the newly elected Committee member is Samuel W. Fernberger.

The matter of policy most worthy of report to the American Psychological Association is that the Section Committee has in process a more definite codification of the procedure for the election of Section officers.

We believe that continued participation of psychologists in the affairs

of the American Association for the Advancement of Science is desirable both for psychology and its allied sciences.

Respectfully submitted,
WALTER R. MILES
JOHN A. MCGEOCH

REPORT OF THE REPRESENTATIVE ON THE AMERICAN DOCUMENTATION INSTITUTE

To the Council of Directors and Members of the American Psychological Association:

The annual meeting of the American Documentation Institute was held in Washington, D. C., on Thursday, January 25, 1940. At this meeting attention was called to the increased use of the Bibliofilm Service, which now has cameras in four great libraries and so can make available a wide variety of scholarly material. The Institute has been experimenting with microfilm in color and can now furnish this service. It has also given some consideration to the copyright problems involved in the use of microfilm. At present the Institute is coöperating with the State Department and the Library of Congress on a plan to make available microfilms of articles in European journals, the distribution of which has been interrupted by war conditions. An article on this project appeared in the April 5, 1940, issue of *Science*, Vol. 91, pages 338–339. The Institute has also been considering the problem of microcopying, on a large scale and in advance of specific needs, the material in foreign depositories that has become difficult of access or is in danger of destruction because of the war. Among other projects are the filming and indexing of newspaper files for library use, the copying of large X-ray plates on microfilm, and the development of standards and apparatus for testing the quality of microfilm.

A circular describing the work of the Institute and information concerning its services may be obtained by addressing the Secretary of the American Documentation Institute, in care of Science Service, 2101 Constitution Avenue, Washington, D. C.

Respectfully submitted,
JOHN E. ANDERSON

REPORT OF THE DELEGATES TO THE INTER-SOCIETY COLOR COUNCIL FOR 1940

To the Council of Directors and Members of the American Psychological Association:

(1) The Ninth Annual Meeting of the I.S.C.C. was held in New York jointly with the Optical Society of America and the American Physical Society, February 21–24. The technical session, consisting of a series of papers on spectrophotometry in the Pulp and Paper Industry, was co-sponsored by the Technical Association of the Pulp and Paper

Industry, which is a member body of the I.S.C.C. This meeting marks the first step in the initiation of a new policy of the Council with respect to the technical sessions which it helps to arrange. Hereafter, the Council will co-sponsor technical sessions on topics in the field of color, which will be held at the time and place of the regular meeting of a member body. The technical session of the 1940 meeting was held under such a coöperative arrangement. In this case, the time of the meeting of the T.A.P.P.I. preceded and overlapped that of the I.S.C.C. The next technical session will be held as a part of the program of the Illuminating Engineering Society at its meeting September 11, 1940, at Spring Lake, New Jersey, on the subject of the relation of illuminants to color vision.

(2) The report for 1939 of the Secretary of the I.S.C.C. contains the following items of interest:

(a) The present membership consists of 11 national associations, the Society of Motion Picture Engineers having been voted a member by letter ballot in December, 1939. There are now 67 individual members, 18 having been accepted by the Executive Committee since the last annual meeting.

(b) By letter ballot, dated May 11, it was voted to adopt the Inter-Society Color Council Method of Designating Colors of Drugs and Chemicals, with boundaries submitted by the Problems Committee (as published in the *National Bureau of Standards Journal of Research*, September, 1939, by Judd and Kelly).

(c) By letter ballot, dated May 11, it was voted to adopt the Inter-Society Color Council Method of Designating Filters for Theatrical Lighting (as published in the *Journal of the Optical Society of America*, October, 1938, by Judd).

(d) During the year 2000 copies of a large-scale ICI chart have been made for sale to members. There are 250 of these charts still available at $3.50 per hundred.

(e) During the year two bibliofilm deposits have been made. Copies may be obtained from the American Documentation Institute, 2101 Constitution Avenue, Washington, D. C.:

Godlove uncompleted bibliography on color, containing nearly 2500 titles—$1.39.

Color Diary of A. H. Munsell, 426 pages—$2.50.

(3) The activities of the Council during the years 1938 and 1939 are summarized in the report of the retiring Chairman for that period:

"It is appropriate that an organization such as this should make regularly a general survey of its progress, in addition to the reports on specific activities. Our Secretary, Miss Nickerson, has written a history of the Color Council as a preface to the technical papers given at the seventh annual meeting. The period which she discussed was the formative phase of this group, in which the organization was initiated and perfected, its aims were formulated, and activities were begun. The now retiring administration came into office at the culmination of this organizational period and at a time when the fruits of efforts in the preceding years were being reaped. It is to some of those results that I would call your attention since they measure in some degree the accomplishments of the first ten years of the Color Council, and indicate its potentialities. The material to which I refer and which is already in your hands amounts to some 300 pages of printed matter of a technical and informative character other than reports of meetings and business of the Council. The work of the Council seems to me so strikingly coöperative that I shall not attempt to give credit in

detail to all of the contributors in any particular case. As I have said, those facts are already a matter of record.

"Under the editorship of Dr. Godlove, which began under the previous administration, the *News Letter* has continued and expanded its function of informing the membership of the activities of the Council. To this it has added a wealth of information about color from a variety of sources. While it has been the aim to develop an editorial policy on the basis of experience within the Council and in response to expressed needs, it has been recognized that such a publication must avoid stereotypy. The result is that we have acquired the habit of looking with anticipation for something new in every issue.

"In 1936 a committee was first proposed to prepare a 'Who's Who in Color.' Such a compilation takes much time and persistent effort. The completion and publication of the 'Who's Who' is one of the first contributions that appeared during the two-year period I am reviewing. Its value needs no comment. In my own experience, I find another document which, though boasting no official title and covering a much more limited field, parallels the 'Who's Who' in usefulness. I refer to the list of member bodies, delegates, and individual members of the Inter-Society Color Council, which has appeared of late with some regularity from the office of the Secretary. It began, I believe, as a convenience for the officers, but its usefulness has exceeded that limitation.

"A short time ago, you received a publication which presents the solution of one of the major problems undertaken by the Council, 'Method of Designating Colors,' by D. B. Judd and K. L. Kelly. This is an achievement with which the Council can justly be proud to have its name associated.

"At about the same time there appeared the partial report of the survey of Color Terms. In its present form, it is obviously incomplete, but it may indicate the need for establishing a more uniform terminology in the field of color. The technical papers presented at the 1938 and 1939 meetings have been published in each case as a unit. These publications, then, form a permanent record of accomplishment of the Council."

FORREST L. DIMMICK, *Chairman*, 1938–39.

(4) The Council is continuing its policy of holding a popular session of invited papers as a part of its annual meeting. The papers for 1940 were on the history and technique of color reproduction and on technical advances in color that affect the artist.

(5) With the displacing of the technical session to the program of a member body, opportunity is given for a half-day session of the Problems Committee at which delegates may present and discuss specific color problems, and action taken by the Council directing the activity of the Problems Committee. Problems which were discussed at the 1940 meeting and upon which activity was continued or initiated include:

(a) Application of the I.S.C.C.-N.B.S. color names to additional fields such as biological descriptions, transparent, translucent, and fluorescent media, ceramic products, microscopic structures, soils, and papers.

(b) Determination and specification of color tolerances in various technical fields.

(c) Extension of the 1939 color terms report into a list of basic color terms with preferred I.S.C.C. definitions.

(d) Illumination for the detection of small color differences.

(e) Development of a standard test for ability to distinguish small differences in color.

The Council directed the Problem Committee to take steps toward the solution of the several problems presented by the delegates.

(6) The Constitution of the I.S.C.C. calls for a new administration every two years. The officers for 1940–1941 are as follows:

Deane B. Judd, O.S.A.—Chairman
Carl E. Foss, A.S.T.M.—Vice-Chairman
Dorothy Nickerson, I.M.G.—Secretary
Norman Macbeth, I.E.S.—Treasurer
Henry P. Gage, I.E.S., O.S.A.
Sidney M. Newhall, A.P.A.
Le Grand H. Hardy, I.M.G.
} Counsellors

(7) The A.P.A. is represented in the administration of the Council by Sidney M. Newhall as Counsellor. Forrest L. Dimmick has been appointed Chairman of the Problems Committee. Harry Helson and Elsie Murray have been appointed to the sub-Committee on the development of a color aptitude test, and others will be asked to assist in the work of that Committee. Michael J. Zigler has been appointed to the Committee on Color Terms and is in charge of furnishing items of psychological interest to the editor of the *News Letter*.

Recommendations:

Your delegation to the Inter-Society Color Council recommends (1) that the A.P.A. continue its membership in the Inter-Society Color Council and (2) that the present delegation be re-elected.

Respectfully submitted,

FORREST L. DIMMICK, *Chairman*
SIDNEY M. NEWHALL, *Voting Delegate*
MICHAEL J. ZIGLER, *Voting Delegate*
FRANK A. GELDARD
CLARENCE H. GRAHAM
JOY P. GUILFORD
HARRY HELSON
THEODORE F. KARWOSKI
ELSIE MURRAY
LOUISE L. SLOAN

REPORT OF THE REPRESENTATIVE TO THE NATIONAL RESEARCH COUNCIL, 1939–1940

To the Council of Directors and Members of the American Psychological Association:

This report has been prepared following a request of the Secretary of the American Psychological Association for a brief statement of the psychological work being carried on by the National Research Council.

Only those plans of the N.R.C. which have interest to psychologists are included here; the activities of the anthropologists are omitted.

During the past winter several committees have been appointed by the N.R.C. to coöperate with the proposed rearmament plans of the Federal Government. In April, 1939, a Committee on Selection and Training of Military Personnel was set up with J. G. Jenkins as Chairman. The work of this Committee was later taken over almost entirely by two new Committees: the first, on the Selection and Training of Aircraft Pilots; the second, an Advisory Committee to the Adjutant General's office on the Classification of Military Personnel.

The Committee on Selection and Training of Aircraft Pilots was organized in October, 1939, under the chairmanship of John G. Jenkins. A Federal grant of $100,000 allocated to the N.R.C. by way of the United States Civil Aeronautics Authority was used to finance a number of projects related to pilot training. Problems dealing with tension, stress during flight, visual instruction, analysis of skills, physiological characteristics of student fliers, criteria and standards of success in learning to fly were attacked. Dr. Jenkins' Committee consists of psychologists, physiologists, and medical and Army specialists. Among the psychologists who have taken part in the program are W. R. Miles, H. M. Johnson, and Ross McFarland. The work of this Committee promises to be extremely worth while. Not only will it be useful in aiding the Government's training program, but it will serve to demonstrate in a striking way the contributions which psychology can make to a very definite problem. Several reports of progress have been made by Chairman Jenkins, and I understood this spring that the prospects for receiving further money from the Federal Government for 1940–1941 are very bright.

The Advisory Committee to the A.G.O. on Classification of Military Personnel had its beginning last November when W. V. Bingham, H. E. Garrett, and J. G. Jenkins were asked to consult with officers of the A.G.O. with regard to a general intelligence test for Army use. As an outcome of this meeting the Committee on Classification was set up, which held its first meeting in Washington in April, 1940. The members of the Committee are C. C. Brigham, H. E. Garrett, L. G. O'Rourke, C. L. Shartle, L. L. Thurstone, and W. V. Bingham, Chairman. As a result of its conferences this Committee has recommended that a test be drawn up for use as a preliminary sorting device. Construction, standardization, item analysis, and other specifications bearing upon the final make-up of the test are in the hands of M. W. Richardson, S. M. Blumenthal, and T. W. Harrell, who are now on detached service in Washington. It seems likely that the choice of personnel to administer and supervise testing programs in the Army will be under the Civil Service. At this time the details of the procedure to be followed are not available.

Another important committee, the Emergency Committee of the A.P.A., of which W. R. Miles is Chairman, has coöperated closely with

the N.R.C. I am informed that a report of the work of this Committee will be sent out soon by Dr. Miles.

Respectfully submitted,

HENRY E. GARRETT

REPORT OF THE REPRESENTATIVE ON THE SOCIAL SCIENCE RESEARCH COUNCIL

To the Council of Directors and Members of the American Psychological Association:

The work of the Social Science Research Council that is of most interest to this Association is the effort being made to raise the level of Social Science Research. One part of this program, as earlier reported here, is the appraisal of good research to discover in what respects it is good. Of the four appraisals thus far made, one—namely, that of "The Polish Peasant in Europe and America" (Thomas and Znaniecki)—has much of value in it for psychologists. The appraisal appears as Volume I of "Critiques of Research in the Social Service" by Herbert Blumer (Social Science Research Council).

The function of the Appraisal Committee has been broadened so as to deal not only with a book or monograph, but with a field of research or with a research problem. As your representative on the Committee had difficulty in supporting a single book or monograph for appraisal, he proposed the appraisal of the field of nature-nurture research as represented particularly by the *39th Yearbook of the National Society for the Study of Education.* This proposal was accepted, but the scope of the appraisal was so broadened as to lead to the formation of a Council Committee on Social Adjustment. In this Committee the nature-nurture field will be only one of a number to be studied. However, a critical survey of the literature in this field is already under way, and several small research projects are being supervised. The formation of this Committee on Social Adjustment provides a convenient locus for a wide range of psychological projects, and your representatives will welcome suggestions for transmittal to the Committee.

For the year 1940–1941 there were 11 applicants for Post-Doctoral Fellowships and 3 were appointed, as follows: John C. Eberhart, Northwestern University; Francis W. Irwin, University of Pennsylvania; and Henry Odbert, Howard University.

There were 20 applications for Grants-in-Aid and 8 awards were made as follows: Margaret W. Curti, Teachers College, Columbia University; Lisbeth Hellersberg, Vocational Service for Juniors, N. Y. C.; Gertrude H. Hildreth, Lincoln School, N. Y. C.; Lois B. Murphy, Sarah Lawrence College; Bernard F. Riess, Hunter College; Livingston Welch, Hunter College; Charles N. Winslow, Brooklyn College; and Wayne Dennis, University of Virginia.

Respectfully submitted,

A. T. POFFENBERGER

Report of the Treasurer and Business Manager of Publications

To the Council of Directors and Members of the American Psychological Association:

I am transmitting herewith the audited accounts of the American Psychological Association and its publications for the year from January 1 to December 31, 1939.

There was a decrease in the balance sheet for the year of $6,392.65. This is accounted for as follows: The most important change which has been made in the balance sheet of the Association has been to reduce the value of the back numbers from $5,500 to $1.00. This step has been taken on the advice of our auditors and is consistent with conservative bookkeeping practice. The amount of $5,500 was the value of the stock of the Psychological Review Company. The back numbers were the tangible assets, but we could find no way to estimate their actual value. During the year our income from the sale of single copies and back numbers was $2,832.69.

The financial statement this year also reflects for the first time the purchase of $1,205.19 worth of addressing equipment. This equipment is not carried on our books at all. The total amount represented by this change in bookkeeping and expenditure is $6,704.19. It will be observed that this latter amount is greater than the actual decrease shown in the balance sheet.

From the income and expense account of the Association it can be ascertained that for the *ordinary* operations of the Association a surplus of $2,864.92 was accumulated. Most of this balance came from the operations of the Treasurer's Office. However, set against this amount we have the item of $1,205.19 for equipment, which was previously mentioned, and also an item of $1,750.98, representing expenses in printing for *Psychological Abstracts* and *Psychological Monographs* which should have been charged to the 1938 expenditures. This leaves us with a deficit of $91.25 for the year's operations. This amount is accounted for in the income and expense schedule. The deficit of the *Psychological Abstracts* is somewhat smaller than we had anticipated. It is expected that this deficit will be even smaller next year. The *Psychological Bulletin* shows a small deficit which in time can be absorbed, but the *Journal of Experimental Psychology* will probably continue for some time to show a deficit of some substantial amount.

Although not reflected in the report for 1939, the special rates for Members and Associates of the Association will help out materially in the total picture for the year 1940. Of course, these club rates will not affect either the *Psychological Bulletin* or the *Psychological Abstracts*.

During the year, particularly from September on, a large number of cancellations of foreign subscriptions were received, and during the year 1940 these cancellations have continued. The loss incurred in these cancellations is about $800.

Respectfully submitted,

Willard L. Valentine, *Treasurer and Business Manager*

Condensed Report of Examination

American Psychological Association, Inc.

Year Ended December 31, 1939

May 16, 1940

Auditor's Certificate

American Psychological Association, Inc.:

We have examined the balance sheet of American Psychological Association, Inc., as of December 31, 1939, and the statements of income and expense and net worth for the year then ended and, without making a detailed audit of the transactions, have examined or tested accounting records of the Association and other supporting evidence, by methods and to the extent we deemed appropriate.

Condensed Comparative Balance Sheets

A summary of the balance sheets at December 31, 1939, and December 31, 1938, follows:

Assets	Dec. 31, 1939	Dec. 31, 1938	Increase Decrease*
Cash	$66,018.39	$68,115.72	$2,097.33*
Accounts receivable—net	1,337.35	133.67	1,203.68
Inventories:			
Valuation placed on stock of back numbers of publications, etc.	1.00	5,500.00-A	5,499.00*
	$67,356.74	$73,749.39	$6,392.65*
Liabilities and Net Worth			
Accounts payable	$1,147.55	$1,202.36	$54.81*
Deferred income:			
Unexpired subscriptions	16,715.67	17,463.26	747.59*
Reserved for special purposes	6,209.86	5,453.67	756.19
Net worth	43,283.66	49,630.10	6,346.44*
	$67,356.74	$73,749.39	$6,392.65*

Note A—Reduced to nominal value of $1.00 during the year.

The decrease of $6,346.44 in the net worth of the Association is accounted for in an accompanying schedule.

Scope of Examination and Other Comments

The following comments relate to the assets and liabilities set forth in the accompanying balance sheet and to the scope of our examination:

Cash on demand deposit and in savings accounts, as shown by the balance sheet, was reconciled with the amounts reported to us by the depositary banks, and cash in office funds was accounted for. Cash trans-

actions were examined to the extent that the aggregate of recorded receipts for the year was traced into bank deposits, as shown by bank statements on file, and the recorded disbursements through bank account for the same period were found to be supported by canceled bank checks as well as by invoices, receipts, or other data on file.

Accounts receivable for sales, reprints, etc. were evidenced by listing the individual accounts, but we did not correspond with the recorded debtors.

The carrying value of inventories of back numbers of publications, etc. was reduced, as of December 31, 1939, to the nominal amount of $1.00. These inventories represent copies of publications ordered at date of printing in excess of subscriptions or printer's overruns, which are stored until sold by the Association. We noted that sales of single copies and back numbers for the years 1936, 1937, 1938, and 1939 amounted to $1,644.79, $2,594.78, $1,849.33, and $2,832.69, respectively. A summary of such inventories is shown in an accompanying schedule.

All ascertained liabilities of the Association at December 31, 1939, have been provided for in the accompanying balance sheet. The liability to authors of psychological monographs was evidenced by listing the individual accounts, but we did not correspond for further confirmation.

Deferred income represents the unexpired portion of subscriptions to the various publications of the Association at December 31, 1939. We made test checks of the computations of the Association with respect to these subscriptions.

Information submitted to us indicated that certain funds reserved for specific purposes were not to be considered a part of the general funds of the Association. Cash in the amount of $2,945.79 carried in a special savings account in People's Savings Bank in Providence represented the unexpended balance of subscriptions received from members for the entertainment of foreign delegates to an international meeting in 1932, plus accumulated interest thereon to December 31, 1939. Under the terms of the gift whereby the Association acquired the *Journal of Abnormal and Social Psychology*, any surplus funds arising from its publication are to be used solely for purposes of that journal. The amount of such surplus funds at December 31, 1939, was determined as follows:

Balance at January 1, 1939	$2,580.15
Net income from operations for the year	599.85
Balance at December 31, 1939	$3,180.00

ERNST & ERNST
Certified Public Accountants

BALANCE SHEET
AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.
December 31, 1939

ASSETS

Cash			
Demand deposit ($84.07 reserved for special purposes)		$18,875.20	
Savings accounts ($6,125.79 reserved for special purposes)		47,113.10	
Office cash funds		30.09	
			$66,018.39
Accounts Receivable			
For sales, reprints, etc.	$1,400.44		
Less reserve	673.72		
		$726.72	
From authors for printing costs, etc.		610.63	
			1,337.35
Inventories			
Nominal value placed on stock of back numbers of publications			1.00
			$67,356.74

LIABILITIES AND NET WORTH

Accounts Payable		
To authors of Psychological Monographs	$777.55	
Advance received from author—to be applied against subsequent publication costs	370.00	
		$1,147.55
Deferred Income		
Unexpired subscriptions to:		
Psychological Abstracts	$7,606.00	
Journal of Experimental Psychology	2,971.99	
Psychological Bulletin	2,215.71	
Psychological Review	1,757.48	
Journal of Abnormal and Social Psychology	1,441.69	
Psychological Monographs	722.80	
		16,715.67
Reserved for Special Purposes		
Surplus funds of Journal of Abnormal and Social Psychology	$3,180.00	
Unexpended balance of funds collected for entertainment of foreign delegates to international meeting in 1932, plus interest earned thereon	2,945.79	
Unexpended balance of funds collected for aid to displaced foreign psychologists	84.07	
		6,209.86
Net Worth		
Balance at December 31, 1939		43,283.66
		$67,356.74

Unexpended balance of funds collected for aid to displaced foreign psychologists		84.07	
Net Worth			6,209.86
Balance at December 31, 1939			43,283.66
			$67,356.74

Net Worth

American Psychological Association, Inc.

Year Ended December 31, 1939

Balance at January 1, 1939				$49,630.10
Deductions				
Net expense for the year—as shown by the accompanying statement of income and expense		$91.25		
Add portion of net income reserved for special purposes:				
Net income of Journal of Abnormal and Social Psychology	$599.85			
Unexpended portion of funds received from Committee on Displaced Foreign Psychologists	84.07			
Interest on funds collected for entertainment of foreign delegates in 1932	72.27			
		756.19		
			$847.44	
Reduction of valuation placed on inventories of back numbers of publications in prior years to nominal amount of $1.00			5,499.00	
				6,346.44
Balance at December 31, 1939				$43,283.66

Income and Expense

American Psychological Association, Inc.

Year Ended December 31, 1939

INCOME	Total	Treasurer's Office	Publications
Dues	$5,695.92	$5,695.92	
Subscriptions paid by Treasurer's Office	10,175.73		$10,175.73
Other subscriptions	19,897.84		19,897.84
Reprints and commissions	6,505.19		6,505.19
Sale of single copies	2,832.69		2,832.69
Interest	737.88	687.65	50.23
Advertisements	463.00		463.00
Received from Committee on Displaced Foreign Psychologists	100.71	100.71	
Miscellaneous	436.66	71.58	365.08
TOTAL INCOME	$46,845.62	$6,555.86	$40,289.76
EXPENSE			
Stipends to editors	$3,954.94		$3,954.94
Stipends to officers	1,900.00	$1,900.00	
Compensation to employees	4,532.40		4,532.40
Abstractors and translators	1,260.01		1,260.01
Payments to authors	1,473.87		1,473.87
Printing costs	24,010.50	452.65	23,557.85
Reprints	2,620.05	44.05	2,576.00
Office expense	1,111.59	470.75	640.84
Yearbook, Annual Meeting, and committee expense	1,091.95	1,091.95	

INCOME AND EXPENSE—*Continued*

EXPENSE—*Continued*	Total	Treasurer's Office	Publications
Payments made by Committee on Displaced Foreign Psychologists	16.64	16.64	
Purchase of addressing equipment	1,205.19	650.00	555.19
Miscellaneous	2,008.75	550.49	1,458.26
TOTAL EXPENSE	$45,185.89	$5,176.53	$40,009.36
NET INCOME BEFORE EXPENSES APPLICABLE TO INCOME RECEIVED IN 1938	$1,659.73	$1,379.33	$280.40
Expenses applicable to income received in 1938	1,750.98		1,750.98
NET INCOME-EXPENSE	**$91.25***	$1,379.33	**$1,470.58**

NET INCOME-EXPENSE BY DIVISIONS

Treasurer's Office	$1,379.33
Journal of Abnormal and Social Psychology	599.85
Psychological Abstracts	**1,146.56**
Psychological Review	749.02
Psychological Bulletin	**230.85**
Journal of Experimental Psychology	**918.15**
Psychological Monographs	**523.89**
	$91.25

* Bold-face figures indicate deficits.

BUDGET FOR 1941

TREASURER'S OFFICE

AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.

Estimated Income

Dues	$6,000.00
Subscriptions:	
Psychological Abstracts	8,700.00
Psychological Bulletin	1,700.00
Interest on savings	680.00
Sale of Yearbooks and Programs	100.00
Total	$17,180.00

Estimated Expenditures

Subscriptions:	
Psychological Abstracts	$8,700.00
Psychological Bulletin	1,700.00
Postage and express	500.00
Telephone and telegraph	10.00
Printing	500.00
Proceedings	500.00
Yearbook	1,000.00
Treasurer's bond	100.00
Secretary's stipend	1,500.00
Treasurer's stipend	400.00
Auditing accounts	400.00
Incidentals, Annual Meeting	250.00
Apparatus exhibit	50.00
Binding Yearbooks	10.00
Committee on Animal Experimentation	25.00
Inter-Society Color Council	25.00
Committee on Displaced Foreign Psychologists	200.00
Committee on Preparation of Examination Questions	50.00
Committee on the Constitution	60.00
Secretary's Office—Roster	300.00
Total	$16,280.00

REPORT OF THE JOINT EMERGENCY COMMITTEE OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION AND THE AMERICAN ASSOCIATION FOR APPLIED PSYCHOLOGY

To the Council of Directors and Members of the American Psychological Association:

The President of the American Psychological Association was authorized at the meeting of the Council at Stanford University in September, 1939, to appoint an Emergency Committee to prepare the profession for any steps that might be necessary in the event of a great national crisis. The Council later voted to designate the Committee as a joint one with the American Association for Applied Psychology. Leonard

Carmichael, President of the American Psychological Association, and Horace B. English, President of the American Association for Applied Psychology, were both made ex-officio members. Although the Committee was not provided with a budget and has not been able to hold a physical meeting, it has, nevertheless, been quite active during the year and has conducted a large amount of correspondence concerning psychology and the government service. Many unofficial meetings of some of the Committee members have been held. The Chairman has had frequent meetings with officers of the National Research Council in Washington, in preparation for the creation of a national register for technical and specialized personnel and in the planning and execution of a national conference on psychology and government service held in Washington August 10, 1940.

Aside from performing the services of a clearinghouse during these past months, perhaps our most important contribution was made in connection with the national conference held on Saturday, August 10, at the National Research Council, Washington, D. C. This conference was arranged by Carl E. Guthe, Chairman, Division of Anthropology and Psychology, N.R.C., at the request of the Chairman of the Emergency Committee. The Associations represented were American Psychological Association, Psychometric Society, Society for the Psychological Study of Social Issues, American Association for Applied Psychology, Society of Experimental Psychologists, and Section I, Psychology, American Association for the Advancement of Science. In addition to these representatives there were in attendance the Chairmen of the several committees already appointed and functioning in reference to psychological problems and government service and the members of the Executive Committee of the Division. Dr. Guthe presided at the sessions of the conference. He called on the Chairman of the Emergency Committee to make a report of the activities of this Committee, then on W. V. Bingham to report the work of the Advisory Committee on Classification of Military Personnel. This was followed by a report by J. G. Jenkins for the Committee on Selection and Training of Aircraft Pilots, set up in October, 1939, under the N.R.C. The fourth report was by L. Carmichael, recently appointed Director of the National Roster of Scientific and Specialized Personnel, set up under the National Resources Planning Board. Following these reports the representatives of each society were asked to describe any activities or plans for government service originating in their several associations. The conference then engaged in a general discussion and was unanimous in recommending the creation of a central national committee to be called Emergency Committee in Psychology and to be set up in the Division of Anthropology and Psychology of the National Research Council. It was recommended that Dr. Guthe, the present Chairman of our Division, be the Chairman of this national committee and that the associations represented at this conference should each be given an opportunity of recommending one member for this committee. It was understood not to be obligatory that an association appoint a member if the society felt it would be adequately

represented through other appointments. The Conference recommended that Dr. Guthe make some appointments at large, so that the final nuclear committee should be constituted of about nine members and should be a truly national committee. It was also recommended by the Conference that in addition to the nuclear committee a small advisory group be set up and attached to it. This advisory group could be constituted by one representative each from U. S. Civil Service, U. S. Public Health, Department of War, Department of Navy, National Resources Planning Board, and perhaps other governmental departments and also some civilian groups.

A third consideration originating in the meeting of August 10 concerned the problem of morale and the present national emergency. It was recommended that our Division of the National Research Council, at an early date, hold a conference on psychology and morale to consider this general field and, if feasible, outline a program.

On August 3 from Secretary Olson's office two confidential letters were circulated to Chairmen of departments of psychology throughout the United States and to members of the American Psychological Association. One of these was prepared by W. V. Bingham as Chairman of the Advisory Committee on Classification of Military Personnel, which has been working in conjunction with the Adjutant General's Office. The other letter was prepared by the Chairman of the Emergency Committee. These letters served to inform our membership concerning activities in progress and plans for work of national importance. In general, the circulated letters appear to have been favorably received. Many who responded indicated their satisfaction in being informed that psychologists were not inactive and offered their own services. Some, in answering, wished to stress the desirability that psychologists lay strong emphasis on constructive work for peace and amicable international relations.

The creation of the Emergency Committee provided a channel through which correspondence from many concerned psychologists could be routed directly to the appropriate government agency. For example, in some instances where psychologists have reserve officer status it has been possible for the Chairman of the Committee to bring their inquiries directly to the attention of the Adjutant General's Office.

The Chairman and some members of the Committee have given most careful consideration to plans matured by a committee of the Western Psychological Association under the chairmanship of Milton Metfessel. We have made an unofficial report to that committee expressing our appreciation of their work.

The Committee has established and maintained contact with all of the psychological associations affiliated with the A.P.A. In general, the officers of these associations have indicated their approval of the appointment of an Emergency Committee and their willingness to coöperate with such a committee.

We assume that, following the organization of the Emergency Committee in Psychology in the Division of Anthropology and Psychology of the National Research Council referred to in the fore part of this

report, the present Emergency Committee will be discharged, and we so request. (See Notes and News.)

Respectfully submitted,

M. BENTLEY
W. V. BINGHAM
H. E. GARRETT
W. S. HUNTER
J. G. JENKINS
H. S. LANGFELD
R. A. MCFARLAND
L. J. O'ROURKE
D. G. PATERSON
A. T. POFFENBERGER
C. L. SHARTLE
R. M. YERKES
L. CARMICHAEL (ex officio)
H. B. ENGLISH (ex officio)
W. R. MILES, *Chairman*

BOOK REVIEWS

KARDINER, A. The individual and his society: the psychodynamics of primitive social organization (with a Foreword and two ethnological reports by R. Linton). New York: Columbia Univ. Press, 1939. Pp. xxvi+503.

Much has been written in the last few years concerning the relation of culture to personality; most of the discussion has, in the end, boiled down to an expression of pious belief that somehow the culture gets internalized in the individual's psychic structure and henceforth determines his behavior. Reasonable as this view may be, there is nothing very original about it. It represents no more than a special application of the laws of learning and perception. The "social maze" that man learns is different in content from a rat's T-maze and involves an additional source of reinforcement and inhibition—interorganismal rewards and punishments—but basically little has been added to our understanding of the personality, *psychologically* considered, by pointing out that people in different societies with different cultures have different habits, goals, motives, and ideals. We know that simply by reading descriptions of different cultures; that is all that makes the cultures different. A more crucial question could be asked—whether, and if so how, culture determines the basic potentialities of the personality with respect to any specific form of modifiability. This question goes beyond the original one of whether motives and other psychological functions differ from culture to culture in that it asks what the consequences of these differences are for the modifiability of the individual personality and, ultimately, for the institutions that actually make up the culture itself.

Kardiner has tackled this problem in a highly workmanlike and sophisticated fashion. His conclusions may or may not satisfy the reader, but in analyzing the problem he has cleared the ground sufficiently for us to see not only what the difficulties in the way of successful solution are but the directions in which future research in this field will and will not be fruitful.

Perhaps the most significant hypothesis presented is that of a distinction between *basic personality structure* and *individual character*. The first is a statement of gross and fundamental differences in the motivational and anxiety systems between whole societal groups; the second relates to individual differences within a culture group. It is the basic personality structure of the members of a given culture that includes the processes whereby institutions are interrelated through the individual. This structure presumably changes very slowly and from generation to generation provides for the development and transmission of institutions. In Marquesan society, for example, there is a problem of serious food shortage at sporadic intervals. This is a source of great anxiety, objectively oriented, in each Marquesan. The reaction to this anxiety may be

described in terms either of the individual's defenses against it or of the society's institutions which have developed in such a way as to assist both in counteracting the physical source of the anxiety and in defending the individual from suffering its pain. The psychological processes involved in the maintenance of these institutions are relatively unmodifiable so long as they are doubly reinforced by the continuing operation of the institution (with its attendant interpersonal rewards and punishments) and the objective danger of food shortage. The basic personality structure of the Marquesan can therefore be said to include an extensive set of anxieties and anxiety defenses about food. He is thus clearly differentiated from contemporary urban Americans, and, more, an area of his personality which is relatively unmodifiable has been delimited. Too complex for summary here are the cultural complications which ensue from the differential birth rate of the sexes; with two and a half men for every woman it is not surprising that a polyandrous marital institution has developed.

This brief description should be enough to indicate the area within which the book makes its contribution. A reviewer can do no more than acknowledge with heartfelt thanks the care and attention to detail that Kardiner has given to the analysis of the problem and the proposed solutions.

Linton's descriptions of Marquesan and Tanala-Betsileo cultures are clear and fairly detailed; this is important, since Kardiner uses these two cultures as laboratories in which to test the usefulness of his conceptions. A lingering curiosity remains, however, as to how much of the interpretation would stand up if it were tested with the kind of data Dollard secured for his analysis of Negro-white relationships in Southerntown.[1]

In spite of its general excellence as a study of the relation of culture and personality, the book contains much in its final theoretical section that will baffle and exasperate both topologists and stimulus-response psychologists. Since Dr. Kardiner is primarily a psychoanalyst it is not surprising that he uses and depends on a subjective (experiential) psychology. His argument is that the individual lives on an experiential basis, that he feels and loves and suffers and jubilates consciously, that in treatment of mentally ill persons it is the experiences of the persons the therapist must change. Probably no objectivist, no matter how vigorous in defense of his systematic position, would deny that it is the individual's own experience of pain to which that same individual *attributes* his motivation for seeking escape. Kardiner falsely concludes from this that psychological concepts must therefore be experiential in character. He dismisses the argument that physics has best succeeded through a technique of conceptualization by the flat and undefended statement that psychology is different. Interestingly enough, most of the discussion of basic personality structure and the relation of individual to institution is phrased in such a way that the experiential terms can be translated readily and meaningfully into the concepts of objective psychology. And the points at which interpretation becomes cloudy or unconvincing are

[1] Dollard, J. Caste and class in a southern town. New Haven: Yale Univ. Press, 1937.

the very times at which it depends on intuitively understood differences between such words as "shame" and "guilt" or "jealousy" and "envy." Until experiential psychology can give sharp operational definitions of these glutinous terms, objectivists are apt to feel that a lot of distinctions are being made between kinds of action or emotion that are not usefully different in any scientific way—that is, for the prediction and control of human actions.

One can ignore these controversial matters, of course, and emphasize the contribution of the first two-thirds of the book. In essence, Kardiner has presented an extraordinarily acute and detailed analysis of the mechanisms whereby primary institutions are interrelated through the individual and secondary institutions are dependently structured on the frustrations and gratifications of primary institutional behavior. In so doing he has presented some challenging hypotheses concerning the influence of culture on the fundamental potentialities of the personality.

ROBERT R. SEARS.

Yale University.

DOOB, L. W. The plans of men. New Haven: Yale Univ. Press, 1940. Pp. xiii+411.

In the Preface of this book Dr. Doob recounts a significant incident when his experiment in a German psychological laboratory was spoiled by the noise of a street fight between Nazis and leftists. The moral is one which American psychologists are beginning to grasp: that the psychologist must consider the plans of members of his society, or their plans may not consider the psychologist's welfare. This book is an excellent example of what may come when the trained psychologist applies his techniques to social problems.

The emphasis throughout is provisional. Doob stresses *planning* rather than *plans*. There is less space than I should have liked to see devoted to the process of judgment, unconscious interference with rational thinking, and techniques of freeing intelligence from emotional handicaps. But these factors are clearly recognized, and their importance in relation to such unrealistic concepts as the "economic man" cogently presented. (Incidentally, I hope that social psychology will soon be established sufficiently that books like this one need not devote several chapters to proving that psychology has a contribution to make in the fields of economics, politics, and sociology.)

Planning may be designated as individual or social. The distinction is not always sharp; individual plans affect the welfare of many people who had no hand in making the plan; social plans are made by individuals and can be evaluated only in terms of their effects upon specific human beings. Individual planning is both necessary and universal. But chaotic plans conflict, result in frustration and aggression. From this we are likely to have social planning develop as individuals seek to compromise their separate activities in favor of a policy which will permit a maximum of gratification and a minimum of frustration.

The most intricate problem in planning is that of value, to which Doob returns often. Plans must be oriented to a value, present, future,

or possible. But people have conflicting values. In a recent case, armaments manufacturers desired a higher profit rate than 8%, while taxpayers wished to keep government expenditures down. It is difficult to set precise standards for values, since they often differ qualitatively rather than quantitatively. One man may enjoy Neo-Byzantine architecture while another likes modern functionalism. It seems unfair to force either to accept the style he does not like. It may be, Doob points out, that we can determine the *total* gratification or frustration which can be expected from a planned action; thus, if indulging a taste for Neo-Byzantine oddities took material which was needed for other men's houses, the total frustration involved would be clearly greater than for the simpler functional style. Doob is properly anxious that social plans shall permit differences in taste, not become too rigid. Flexibility in both plan and administration is needed to avoid the evils of fascist and communist planning.

Planning is further complicated by the fact that the plan itself becomes a social datum which may modify the situation for which the plan was created. Any serious attempt in 1928 to plan for the 1929 depression would have precipitated the depression sooner. Planning for war brings war closer rather than farther away.

The book deals deftly with some of the stock criticisms of planning. The cries of "hedonism" (pp. 153–163), "regimentation" (pp. 172–175), and "liberty or license" (pp. 202–205) are handled very well.

To apply his principles of successful planning, Doob analyzes several specific cases, viz., highway, housing, community, and health planning. Larger questions of economic and political planning receive a chapter each. The author shows a curious aversion to the term "master plan." Actually, the whole logic of his position requires master planning. For he admits that individual plans conflict and require harmonization through group planning. But do group plans conflict? England and Germany have at the moment mutually exclusive (and destructive) plans. A world without war will not be achieved without a master plan which is sufficiently flexible to provide for a minimum of frustration, yet which prevents the plans of national groups from taking violent forms.

Doob's answer to the dilemma of totalitarianism *vs.* anarchy is regional planning. Here he hopes to see developed a form of group organization which would be small enough to have a high degree of in-group loyalty and mutual identification, but which would still be under the supervision of the nation sufficiently that conflicts between regions would not be expressed in violence. This would be facilitated by reducing the general level of frustration through intelligent planning sufficiently that not much aggression would need to be drained off in out-group hostility. I think this solution offers much less hope than the world-organization idea—for reasons too lengthy to detail here.

The book leaves a distressing feeling of lack of closure—partly for entirely defensible reasons, partly because of the author's aversion to definitive statements. This habit of circumlocution probably hits an all-time high on page 351 when he writes: "Since perfection in planning cannot be achieved, consequently all attempts at planning should not be

abandoned, especially in view of the fact that some forms of planning cannot be avoided."

Despite this defect, the book is exceedingly important and merits the careful study of all social psychologists. It has marked out a new area for exploration, experiment, and theoretical synthesis. It will be remembered for a long time.

Ross Stagner.

Dartmouth College.

Lindquist, E. F. Statistical analysis in educational research. New York: Houghton Mifflin, 1940. Pp. xi+266.

According to the author, the primary purpose of this volume has been "to translate Fisher's exposition into a language and notation familiar to the student of education," with special emphasis upon the place of *design* in educational research. The individual who assigns himself this task takes on no small order. A literal translation of Fisher's work would be no more intelligible than the original, except in so far as one makes such obvious renditions as schools for plots, classes for blocks, scores for yields, and methods for treatments. A free translation, with an attempt at simplification, is apt to become embellished with words. The present volume, in the opinion of the reviewer and student readers, suffers from an overdose of wordiness which makes tedious reading of an otherwise excellent treatment of such topics as Chi Square, small sample methods, and particularly the analysis of variance. Fully one-half the book is concerned with this latter topic, which is treated in detail and well stocked with illustrative examples drawn from the field of educational research. A psychologist should find herein much which will help him see possible uses for the variance technique.

The reviewer does not propose to burden the reader with a barrage of minor points whereupon he finds himself in disagreement with Professor Lindquist, nor does he propose to list here the all too numerous typographical errors which have been detected. These we are sending direct to the author with the hope that all owners of the volume can be supplied with *errata*. There are, however, several major slips which need to be considered.

The derivation on pages 48 to 50 is badly muddled. The mere change of a plus to a minus (as penciled in the copy sent to the reviewer) does not correct the erroneous notion in the first line on page 49 to the effect that the sum of the deviations in a sample from the population mean is zero, nor does this simple sign-change make correct the statement on page 50 that the first right-hand term of formula 6 becomes the true variance of the population. The confusion here can best be eradicated by interchanging the mean of d and d' so that the deviation of any measure from a sample mean is d and from the population mean, d'. This makes the notation consistent with that given later in Chapter 5. With this change in d and d', one can begin with the expression $d_1 = d'_1 + (M_1 - M)$ and easily arrive at Lindquist's formula 7.

The footnote on pages 99 and 100 contains several obvious typographical errors and includes a computational or copying error (thrice

2.3026=6.9078, not 7.9078) which, as best we can tell, has entered into later work (pp. 138–139). The *n*'s in this same footnote are properly defined as the numbers of degrees of freedom, but in the illustrative example the sample numbers are wrongly used instead.

We next raise a puzzling question for which we have no definite answer. Beginning on page 107, the analysis of variance technique is applied to an educational-methods experiment involving five schools and three methods, with twenty pupils in each of fifteen classes. The analysis is carried through on the basis of the fifteen class means in such a way that neither the number of pupils nor the pupil variation enters into the analysis. This at first struck the reviewer as being indefensible, but a few pages later (p. 117) one finds that the pupils have their inning *via* the "within classes" variation, but this latter variation is not utilized because the "interaction variance" is larger than the "within classes" variance. The reviewer suspects that something is wrong with a test of significance which does not involve the variation of the individuals upon which the means are based. We are unable to locate the fallacy here, if there be such, but we have in mind a worked-out example in sex differences which shows no significant difference in length at birth when analyzed by the variance technique using means, but which yields highly significant differences when analyzed by the ordinary critical ratio procedure. We are not claiming that the author is wrong in arguing that intact groups are the proper sampling units, but rather that the case is not convincingly stated.

The section on pages 132–139 having to do with checking the assumption of homogeneous variance contains several serious errors. These the reviewer detected when attempting to learn why the two tests of significance applied in Tables 9 and 10 led to such strikingly diverse results. We have always thought that the Chi Square technique was a fairly efficient method for checking the discrepancies between observed and theoretical distributions, so we were surprised to find the author questioning its adequacy. This is first done on page 40, where it is said, in connection with goodness of fit leading to a Chi Square probability of .10, that "it is probable that if we had applied some more efficient test [based on moments] of goodness of fit . . ., we could quite confidently have rejected the hypothesis of normality." Now it happens in this example that the more (?) efficient test leads to no such thing. As to the lack of agreement between the two tests for homogeneity of variance as given in Table 10 (pp. 138–139), one wonders why the enormous discrepancies between the probability figures obtained by the Chi Square test and the Lambda test did not lead the author to search for error. This has become the unwelcome job of the reviewer.

In the first place, we note two errors in connection with Table 9 which are apparently also involved in Table 10. The Chi Square value has been computed on the basis of percentage or relative, rather than absolute, frequencies. This can be corrected by multiplying the value so obtained by N/100. The number of degrees of freedom is wrongly taken as one less than the number of intervals—an additional degree of freedom must be deducted to allow for the restriction that the mean of the vari-

ances has been utilized in setting up the theoretical frequencies. Incidentally, one wonders about the meaning of eight of the nine Chi Square probability figures in Table 10. What does ".20<P<.10" mean? If .20 is less than P, how can P be less than .10?

In the second place, the Lambda test of Neyman and Pearson as applied in Table 10 is apparently not the Lambda test at all, but rather the Bartlett test, cited by Lindquist in the above-mentioned footnote. It appears, moreover, that an error has been committed in applying the Bartlett test. As best we can tell by working from the frequency distributions instead of the original undistributed values, this error consisted in arriving at a normal deviate by taking $\sqrt{2\chi^2-2n-1}$ instead of the correct form, $\sqrt{2\chi^2}-\sqrt{2n-1}$. The reviewer has performed on the data of Table 10 the calculations necessary for the Chi Square test, the Neyman-Pearson test, and the Bartlett test. For the reasons just given, our values do not check with those of Lindquist, but more important is the fact that correct (we hope) applications of these three tests lead to probabilities which are in fair agreement. Furthermore, the evidence for significant heterogeneity of variances is not nearly so great as supposed by Lindquist.

The final chapter which deals with miscellaneous problems in correlation analysis contains a formula on page 218 which needs correction. The k's in their first appearance should be to the fourth power, and in their second appearance they should be squared, while they should vanish entirely from the denominator. Later in this chapter, considerable evidence is given to show how reliability coefficients vary from school to school. We wonder why this variation was not related to, and thereby partly explained by, previously cited differences in trait variances.

Despite the enumerated, and easily corrected, shortcomings of the text, Professor Lindquist has given us a book which should be particularly useful to all who are interested in obtaining nonmathematical knowledge of the variance technique and to those who plan research programs in education. If certain parts of the text seem vague, it should be remembered that the exposition of certain of the topics covered is no easy task.

QUINN MCNEMAR.

Stanford University.

VERNON, P. E. The measurement of abilities. London: Univ. London Press, 1940. Pp. xii+308.

It can be said that only about one-third of this volume is devoted specifically to its title. The other two-thirds is about equally divided between statistical methods and a discussion of school examinations. The attempt to include so much within one book has, despite concise writing, led to a somewhat superficial treatment of some of the topics. This has, without doubt, diminished the usefulness of the book to those for whom it is primarily intended: teachers and examiners, psychologists as scientists, and doctors and psychologists as clinicians.

The reviewer has no quarrel with any part of the book which is

devoted to statistical techniques except the sketchiness. Any hundred-page exposition which begins with the most elemental concepts and progresses through sampling, goodness of fit, linear and curvilinear correlation, to, and including, partial and multiple correlation, is apt to be so sketchy as to be practically worthless. The beginner in statistics will find the discussion inadequate, and the more sophisticated will not find it useful.

The chapters dealing with ordinary mental tests and problems related thereto are somewhat more adequate. The author rightfully stresses the necessity for a more cautious and critical use of tests, and presents some of the criticisms which have been raised against the 1937 Revised Stanford-Binet. In these chapters one readily notices the influence of Spearman. It would seem that the author has more faith in the symbol *g* than in the general intelligence measured by the Binet type of test. This leaning towards Spearman and *g* and an *assumption*, upon which a criticism is based, that the 1937 Stanford Revision "measures an unanalyzed hotch-potch of abilities" (p. 193) seems amusing when it is recalled that Spearman is on record as saying that *g* is measurable by any hotch-potch collection of tests (*Psychologies of 1930*, pp. 343–344). Then on page 195 the reader is told that the author "would agree with Spearman, Cattell [R. B.], and Kent that the New Stanford Revision is a distressingly unscientific instrument owing to the heterogeneity of its content." One wonders why Kent, whose main thesis seems to be that the 1937 Revision is not flexible enough for clinical work, should be cited in this connection. As to the supposed heterogeneity of the Stanford-Binet, it might be remarked that the recent *Psychometrika* paper of Wright and the far more extensive unpublished analyses of the reviewer agree in revealing a surprisingly (to some) large common factor in the Binet.

The last part of Vernon's book is an excellent, concise discussion of various types of school examinations exclusive of standardized achievement tests. The reviewer is of the opinion that any instructor, whether at the secondary or college level, who is having examination worries will find the last four chapters very worth while.

QUINN MCNEMAR.

Stanford University.

GUILLAUME, P. La psychologie animale. Paris: Armand Colin, 1940. Pp. 210.

It is doubtful whether the student who approaches animal psychology for the first time could find a better brief introduction than is provided in this interesting little volume. By describing a few researches from each field and summarizing the trend of other relevant studies Professor Guillaume has been able to make his brief survey cover much ground. His selection of researches for specific mention is such as to give a good idea of what is being done in representative European and American laboratories. Chief stress is placed upon the disclosing by objective animal psychology of mechanisms basic to both infrahuman and human behavior, especially mechanisms which cannot be investigated adequately

in human beings directly. Successive chapters present discussions of the purpose of animal psychology, objective methodology, concrete application of methods, instinct, intelligence, and man and animals.

An objective approach to animal psychology is faced with questions concerning the existence of consciousness in animals, the respective rôles of psychology and physiology, and the desirability of using a vocabulary shorn of subjective connotations. Professor Guillaume regards the problem of animal consciousness as beyond solution until such time as much more is known about the physical bases of human consciousness. In his opinion, analogies possible at the present time warrant a statement no more enlightening than that animals have *something* like human consciousness—a statement which, while it is regarded as reasonable philosophically, is admitted to be of little or no scientific value. According to Professor Guillaume, the objective animal psychologist does not avoid the issue; he merely defers the answer. Animal psychology and physiology are differentiated in terms of the fact that the former tends toward molar, and the latter toward molecular, analysis of behavior. Psychological terms already in use, since they are grounded in objective circumstances, may serve an objective psychology of animals. It is merely necessary to remember that these terms have both subjective and physical connotations and that animal psychology uses the latter.

Naturalistic and laboratory observations provide supplementary information. It is pointed out, furthermore, that the psychologist not familiar with animal behavior in the field may, in arranging his experiments, be misled by a naïve anthropomorphism. Laboratory experimentation provides information not available to the naturalist *per se, e.g.* concerning the sensory bases of orientation. Considerations of methodology cover the topics of sensory and perceptual processes, the learning process, memory, motivation, and social behavior. The range of animals included is from invertebrates to apes.

The chapter on instinct includes a discussion of tropisms, much of which concerns the Loeb-Jennings controversy. In the reviewer's opinion, Professor Guillaume's discussion of instinct is weakened by the fact that researches on mammals are given but brief mention. If the studies of Stone, Bingham, and others on sex behavior had been considered, it would have been possible to show that a physiological drive remains relatively constant during the evolution of mammals while overt behavior becomes decreasingly stereotyped. Internal and external conditions and variability are discussed at some length, but the illustrative material is primarily from investigations with insects and lower vertebrates. The description of experiments with these forms is excellent.

Intelligence is discussed in terms of perceptual processes, maze learning, distance orientation, problem-solving, utilization of implements, and use of symbols. It is pointed out that increasingly analytical perception, increasingly facile use of implements, and increasing ability to respond in terms of symbols are important factors in the evolution of intelligence. Differences in the use of implements and symbols by man and animals are considered in the final chapter, which includes a discussion of values which human psychology may derive from work with animals.

Sources are cited merely by mentioning the name of the investigator. Thus, readers not already acquainted with a particular research will have difficulty in finding the original report.

NORMAN L. MUNN.

Vanderbilt University.

SCHOEN, M. The psychology of music: a survey for teacher and musician. New York: Ronald Press, 1940. Pp. vii+258.

That the boundaries of the psychology of music are not yet well defined will be evident to anyone who compares the three most recent texts in the field.[1] Schoen's book, the fourth to appear in three years, resembles most that by Mursell. It covers material to be found in 124 references and includes a selected bibliography of 264 titles for those who wish a fuller knowledge of the field.

In the opinion of the reviewer the text displays few sins of commission. Three which seem of considerable importance are here listed: (1) Schoen's book has a decided hereditarian bias which is carried to the point of confusing the terms phenomenological and inherent. As experiments planned to prove the inherent character of a tonal attribute can almost never be conclusive, it is better to employ on most occasions the weasel word, phenomenological. (2) Schoen gives the impression that the music of our day is still written in the pre-Bach scale. Fortunately, most readers will know better. (3) The fact that the several experiments referred to in discussing a number of the important topics do not agree among themselves does not often disturb the author, who writes as though there were few such difficulties. Such an approach will prove disturbing to the critical reader.

Valuable data hitherto unpublished are presented in the section on music tests. These include validation material on the Schoen tests and a discussion of Ortmann's measures currently in use at the Peabody Conservatory of Music. Schoen's test philosophy can be said to fall somewhere between the atomistic position of the experimentalist Seashore and the Gestalt view of the philosopher-educator Mursell, but comes closer in its resemblance to the position of Seashore.

Schoen intends his text primarily for the musician. The reviewer guesses that this purpose is rather adequately met, as the book is not too philosophically sophisticated as was Mursell's nor does it cover as narrow a field as did Seashore's. It is smoothly and interestingly written. While Schoen's secondary hope "that psychologists will find . . . [it] an adequate . . . summary of accomplishment in this field of psychological research" may be too optimistic, it is quite probable that experimentalists will find it a real aid to their labors.

PAUL R. FARNSWORTH.

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[1] Mursell, J. L. The psychology of music. New York: Norton, 1937; Seashore, C. E. Psychology of music. New York: McGraw-Hill, 1938; Diserens, C. M., & Fine, H. A psychology of music. Cincinnati: Authors, 1939.

SHAFFER, L. F., GILMER, B. VON H., & SCHOEN, M. Psychology. New York: Harper, 1940. Pp. xii+521.

With the vast number of textbooks available for courses in introductory psychology, the critic, on reading a recent addition, may well ask: What does the present text offer that is not at hand in books already on the market? Presumably, a contribution might be made in originality of style, point of view, or treatment of subject matter.

In the present instance, the style can be damned with faint praise. There are few, if any, incoherencies, and only an occasional instance of awkwardness. Likewise, there is nothing extraordinary to arouse the reader's interest or to whet his appetite, and, upon completing it, he could easily have the feeling of having eaten a well-balanced, but predigested and uninspired, diet. Possibly this is because the book is a joint authorship, where each writer's originality is repressed by the criticism of his associates.

The point of view of the book is evidently eclectic. There are several chapters on behavior, followed by four chapters on the dimensions of consciousness or experience, in which the clumsy circumlocutions of the biopsychologists' discriminatory responses are avoided. The authors apparently credit college students with insight enough to understand that they do have experience and that they are further correct in assuming that psychology is somehow concerned with this topic. In the light of much modern writing in the field, this is not faint praise, but an outright compliment for a forthright job.

With respect to subject matter, it is almost all there—almost. A notable omission, which is serious today, is the topic of heredity. There is a growing body of experimentation here of sufficient significance regarding mental traits to warrant its inclusion in a text otherwise as inclusive as this one. In the reviewer's opinion, this topic could nicely replace Chapter II on "The Nature of Human Adjustments," which includes a recitation of the obvious plus the abracadabra of S—O—R and similar nonoperational and inconsequential formulae. Otherwise, the treatment of subject matter is sufficiently comprehensive for an introductory text.

From the above description, the teacher can surmise that there is available just another textbook for students of general psychology. He can examine it and discard it, or perhaps reconsider and select it for a trial, feeling that he has a representative sample of the crop, meanwhile hoping to do something better in the future himself. Can this be why there are so many textbooks at our command, or is there something about the textbook business that this reviewer does not understand?

GEORGE M. PETERSON.

University of New Mexico.

GRIFFIN, J. D. M., LAYCOCK, S. R., & LINE, W. Mental hygiene: a manual for teachers. New York: American Book, 1940. Pp. xi+291.

The lack of mental hygiene sensitization among teachers has been remarked repeatedly during the past decade. Furthermore, it is greater

than statements in the present volume sometimes imply. This lack among teachers is unfortunately out of accord with modern educational theory, which recognizes a rather close parallel between the aims of education and those of mental hygiene.

It is the purpose of this book to make available to teachers and student teachers some fundamentals of mental hygiene thinking, especially as they relate to classroom and school problems. The volume succeeds in achieving this purpose. In a simple, but psychologically sound, manner the exposition considers successively the nature of development, personality symptoms, classroom diagnosis, methods of dealing with problems of subnormal, superior, and physically handicapped children. Beyond these questions of classroom problems the mental hygiene aspects of the home community—school relation, the school organization, and the teacher—are discussed in separate chapters. One chapter describes formal mental hygiene clinical services used in schools, and a final chapter evaluates the place of the school in the development of mental health. No attempt is made to present research results, but there are liberal references to more exhaustive works on general problems. Each chapter has a carefully selected list of readings and, in some cases, directions for securing tests and collateral materials. Unfortunately, the authors or the publishers have seen fit to do without an index.

This book is not a treatise on mental hygiene, as might be inferred from the backbone title. It is rather a very good elementary text especially directed to teachers. Its use in teacher training schools should be great; as a psychological text it is too specialized.

C. M. Louttit.

Indiana University.

Brown, W. Psychology and psychotherapy. (4th ed.) Baltimore: Williams & Wilkins, 1940. Pp. viii+260.

This new edition of Brown's work, first published in 1920, has added chapters on "Sublimation and Spirituality" and "The Problems of Later Life." It has the authoritative, pastoral tone that one associates with British psychiatry of an earlier day; draws heavily upon the thinking of McDougall, Ribot, Bergson, and the early Freud; and moves inexorably toward its concluding chapter on "Psychical Research. The Eternal Values."

William A. Hunt.

Wheaton College.

BOOKS RECEIVED

ANDERSON, J. P. A study of the relationships between certain aspects of parental behavior and attitudes and the behavior of junior high school pupils. New York: Bureau of Publications, Teachers College, Columbia Univ., 1940. Pp. vi+196.

CLEMMER, D. The prison community. Boston: Christopher Publishing House, 1940. Pp. xi+341.

GENTRY, J. R. Immediate effects of interpolated rest periods on learning performance. Teach. Coll. Contr. Educ., No. 799. New York: Bureau of Publications, Teachers College, Columbia Univ., 1940. Pp. vi+57.

LAZARSFELD, P. F. Radio and the printed page: an introduction to the study of radio and its role in the communication of ideas. New York: Duell, Sloan, & Pearce, 1940. Pp. xxii+354.

MACINTOSH, D. C. The problem of religious knowledge. New York: Harper, 1940. Pp. xvi+390.

MANNHEIM, K. Man and society in an age of reconstruction: studies in modern social structure (with a Bibliographical Guide to the study of *Modern Society*). New York: Harcourt, Brace, 1940. Pp. xxii+469.

MIKESELL, W. H. Mental hygiene. New York: Prentice-Hall, 1939. Pp. xvi+456.

SAUNDERS, E. Lourdes. New York: Oxford Univ. Press, 1940. Pp. 292.

SEELY, H. F., & HACKETT, W. A. Experiences in speaking. Chicago: Scott, Foresman, 1940. Pp. xiv+512.

SHELDON, W. H., with the collaboration of S. S. Stevens & W. B. Tucker. The varieties of human physique: an introduction to constitutional psychology. New York & London: Harper, 1940. Pp. xii+347.

SIMMONS, E. J. Dostoevski: the making of a novelist. New York: Oxford Univ. Press, 1940. Pp. x+416.

NOTES AND NEWS

DR. WILLARD L. VALENTINE, Business Manager of the publications of the American Psychological Association and formerly associate professor of psychology at the Ohio State University, has assumed his duties as chairman of the department of psychology at Northwestern University. Communications to the Business Office should be addressed to 1822 Sherman Avenue, Evanston, Illinois.

DR. CHARLES M. HARSH, recently of Randolph-Macon Women's College, has been appointed assistant professor of psychology and assistant in the Bureau of Instructional Research at the University of Nebraska.

DR. ERNEST H. LINDLEY, chancellor emeritus of the University of Kansas, professor of psychology from 1898 to 1917, died on August 21 aboard the Japanese liner *Asama Maru*. He was 71 years old.—*Science*.

DR. MILICENT WASHBURN SHINN, known for her early work in child psychology, died on August 14 at the age of 82 years.

VOLUME 1, Number 1, of the *Quarterly Journal of Studies on Alcohol*, under the editorship of Howard W. Haggard, appeared in June, 1940. Manuscripts should be submitted to the journal at 4 Hillhouse Avenue, New Haven, Connecticut.

THE National Research Council announces that the following Emergency Committee in Psychology was appointed in the Division of Anthropology and Psychology on October 5, 1940:

K. M. DALLENBACH, Chairman, Cornell University—representing the American Association for the Advancement of Science, Section I.

WALTER R. MILES, Yale University—representing the American Psychological Association.

R. A. BROTEMARKLE, University of Pennsylvania—representing the American Association for Applied Psychology.

GORDON ALLPORT, Harvard University—representing the Society for the Psychological Study of Social Issues.

DAEL WOLFLE, University of Chicago—representing the Psychometric Society.

CARROLL PRATT, Rutgers University—representing the Society of Experimental Psychologists.

WALTER S. HUNTER, Brown University.

LEONARD J. CARMICHAEL, Tufts College—Roster of Scientific and Specialized Personnel.

ROBERT M. YERKES, Yale University.